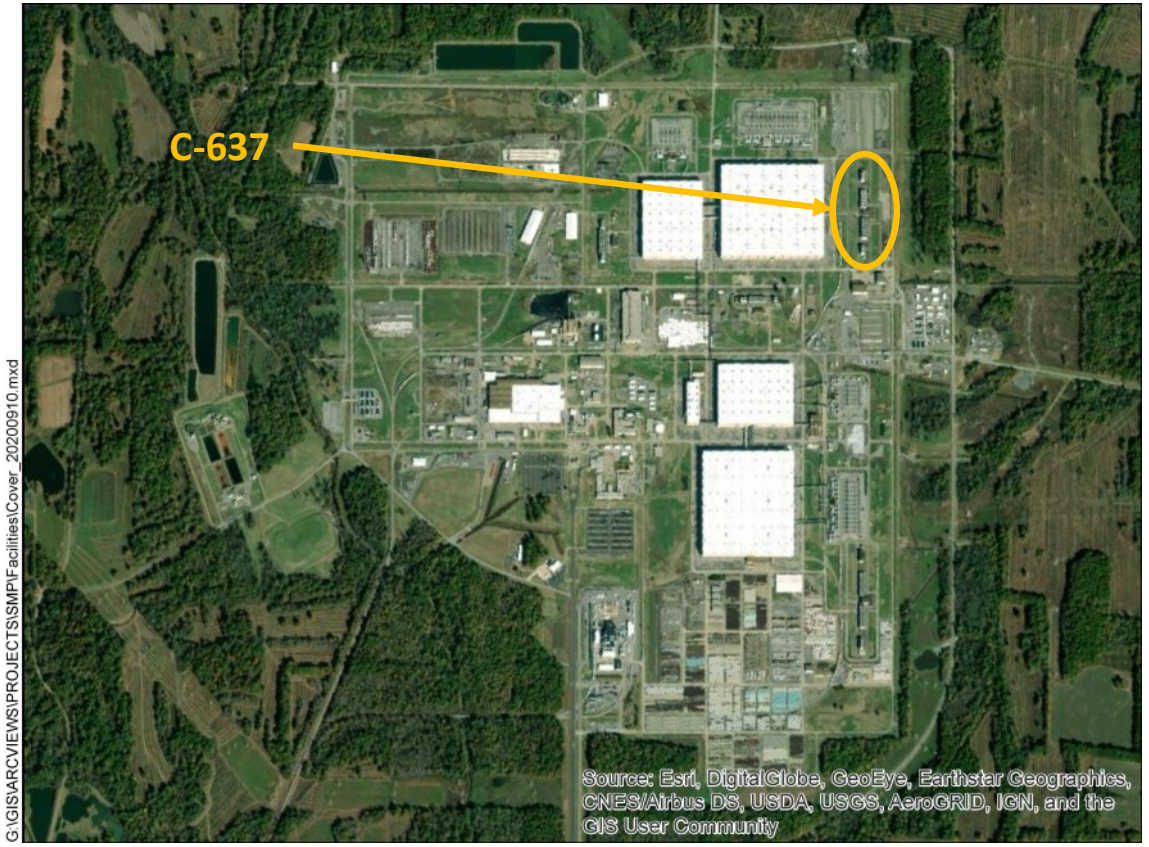
C-637 Pumphouse and Cooling Tower (Solid Waste Management Unit 89)



Facility Overview Briefing

June 22, 2023

Reflects consultation with EPA and Kentucky in accordance with the Site Management Plan that occurred on June 22, 2023.

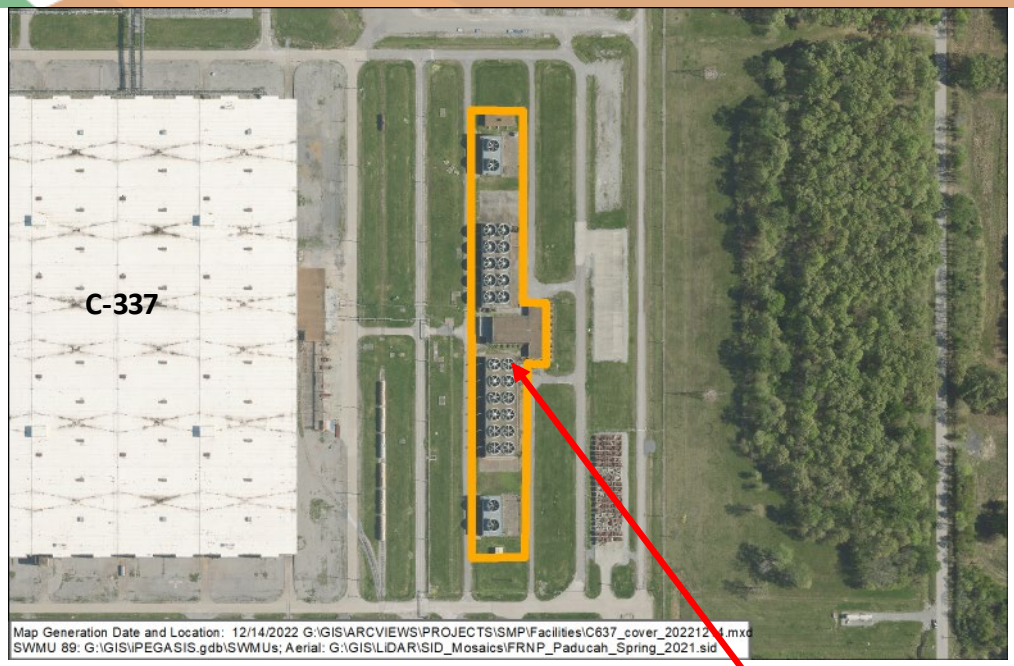
Purpose

- The C-637 Pumphouse and Cooling Tower is discussed in Appendix 4 of the Site Management Plan (SMP) and is designated as Solid Waste Management Unit (SWMU) 89.

- The C-637 Pumphouse and Cooling Tower (SWMU 89) is a candidate for future demolition and disposal, contingent upon funding priorities.

- The current SMP strategy includes the removal of the C-637 Pumphouse and Cooling Tower (SWMU 89) facilities as part of the Facility D&D Operable Unit (OU) and evaluation of underlying soils and slabs as part of the Soils and Slabs OU.

- This presentation is intended to serve as clarification of which C-637 Pumphouse and Cooling Tower facilities are associated with SWMU 89 and to document DOE's consultation with EPA and Kentucky for demolition and disposal of the aboveground structures outside of the FFA/CERCLA process.



C-637 Cooling Tower Photo: 3/2023

Construction History

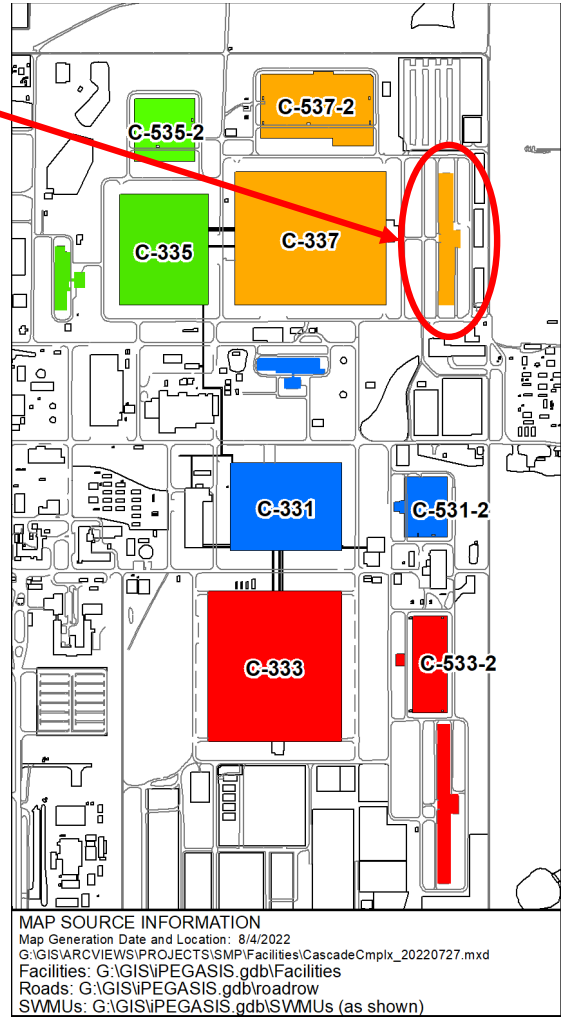
- The C-637 Pumphouse and Cooling Tower (SWMU 89) is located within the Paducah Site security fence, east of the C-337 process building. (Note: C-637 Complex can be flexed in and out of the limited security fence.)

- Construction of the C-637 Pumphouse and Cooling Tower began in 1953/1954; with additional facilities added in 1975/1976 and 1981.

- The C-637 Pumphouse and Cooling Tower is one of four similar sets of facilities designed to support the process buildings (C-331, C-333, C-335, and C-337).
  - The C-637 Pumphouse and Cooling Tower supported the C-337 process building and C-360.

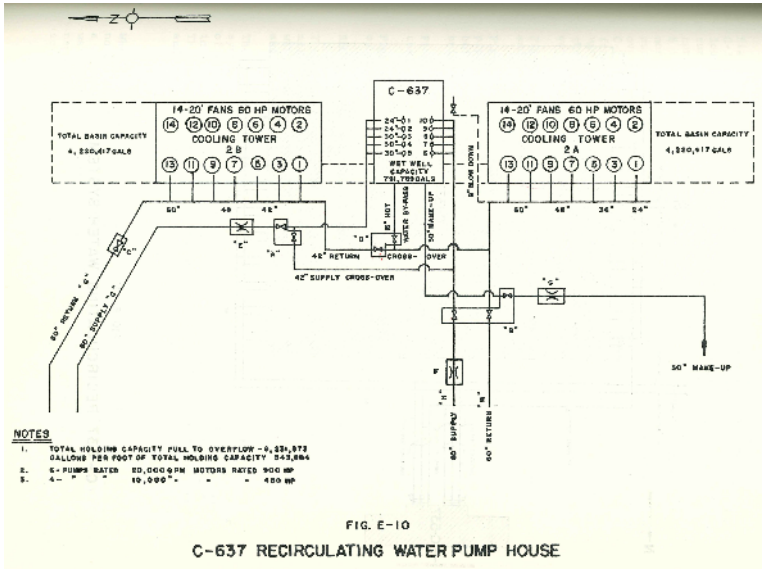
- In addition to the process buildings, the four cooling tower and pumphouse facilities also supported additional plant facilities (e.g., switchyards).
  - The C-637 Pumphouse and Cooling Tower supported the C-537 Switchyard synchronous condensers.
  - In February 1997, the C-637 Pumphouse and Cooling Tower was modified to support the Northeast Plume interim remedial action.
  - Crossover exists between the C-635 system and the C-637 system through C-337 headers 1RB, 2SB, 3RB, 4SB, 5RB, and 6SB to C-635.

- The cooling tower and pumphouse facilities were, often referred to as "recirculating cooling water (RCW) plants"
  - Designed to continuously pump cooling water through the process and auxiliary building heat exchangers associated with the gaseous diffusion process.



Construction History

- RCW Cycle:
  - Cooled water was pumped from the pump house through underground supply headers to the process building and into heat exchanger units where the water temperature rose as the water absorbed heat from the process equipment. Heated water was then returned through underground return mains (gravity feed) to the cooling towers where the heated water was distributed through various sections of the cooling tower and heat was released via evaporation. The cooled water was then collected into the cooling tower basin where it flowed by gravity via a flume into the wet well located underneath the pump house.
    - Cooled water from the pump house was also pumped through underground supply headers to the synchronous condensers located in the switchyard; where the water was heated and then returned through underground return mains (gravity feed) to the cooling towers
  - Approximately 500 million gallons per day (MGD) of water was recirculated through the four cooling tower and pumphouse facilities with nearly 8-25 MGD of water loss to evaporation each day depending on the plant load or power level.

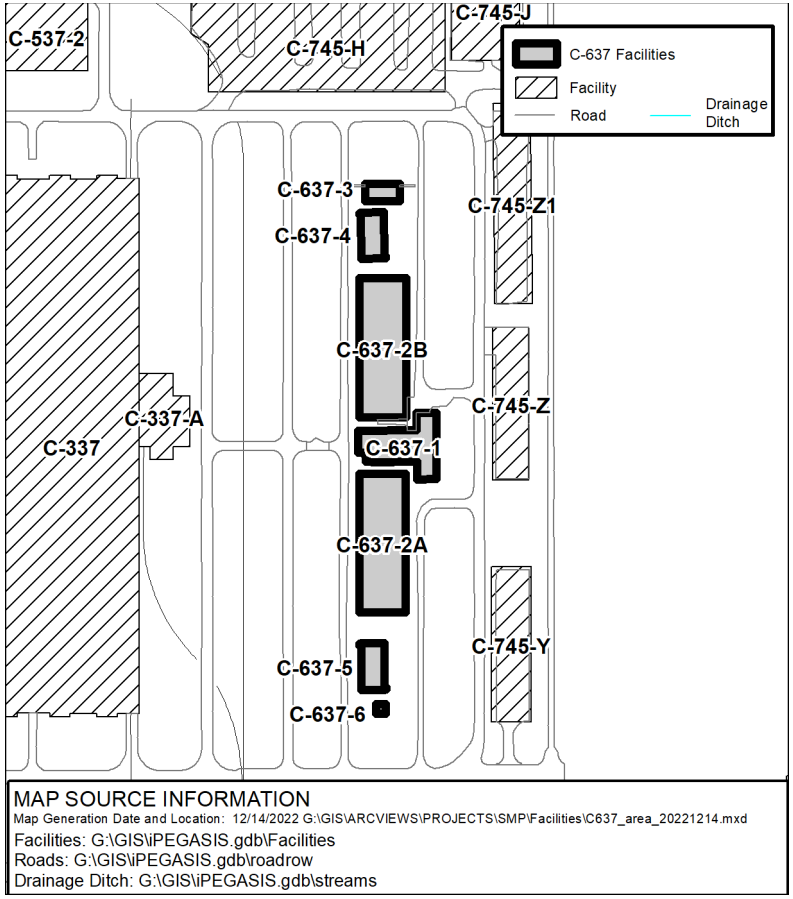


C-637 Cooling Tower Diagram: 7/1962

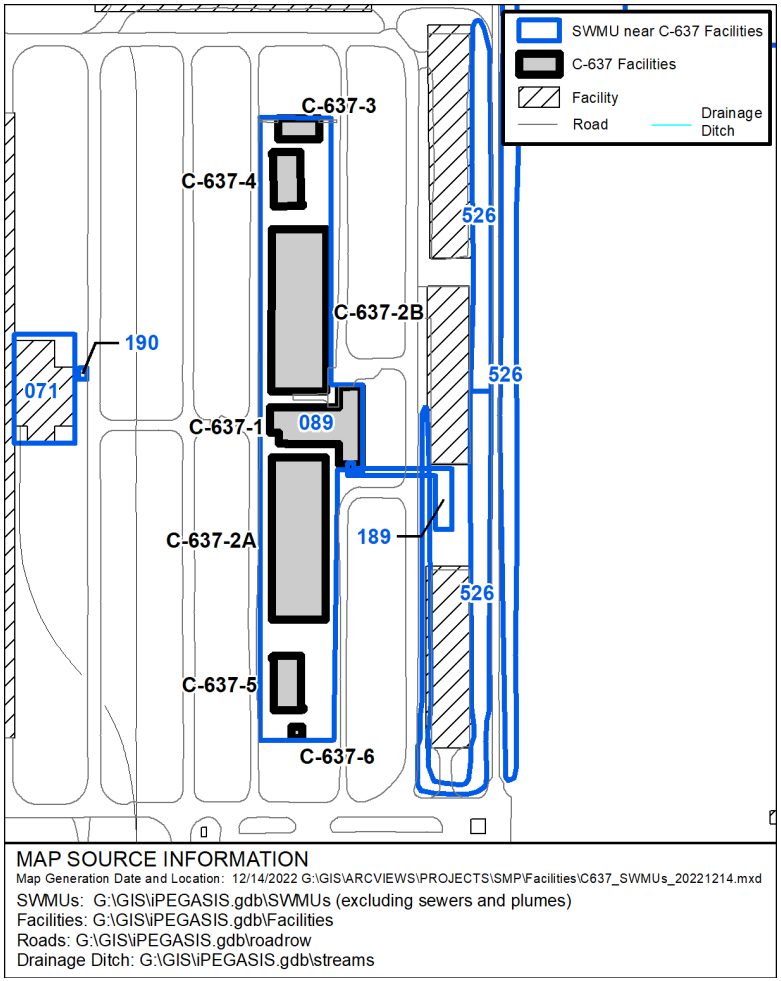
- Each pumphouse and cooling tower contained the following.
  - Pump house
  - Main cooling tower(s)
  - Blending pump house
  - Blending cooling towers
  - Other support buildings

Construction History

- The C-637 Pumphouse and Cooling Tower is made up of multiple facilities generically referred to as the C-637 Cooling Tower.
  - C-637-1 Pump House and Piping
  - C-637-2A Cooling Tower (South)
  - C-637-2B Cooling Tower (North)
  - C-637-3 Blending Pump House
  - C-637-4 Blending Cooling Tower (North)
  - C-637-5 Blending Cooling Tower (South)
  - C-637-6 Sand Filter Building
- The total area for all the main structures associated with C-637 Cooling Tower is approximately 46,713 ft^2; with construction details, operational history, and current status for each facility discussed in subsequent slides.



Environmental Impacts (Solid Waste Management Units)



- The current SAR (SWMU 89) for the C-637 Pumphouse and Cooling Tower does not identify the specific facilities that are included in SWMU 89.

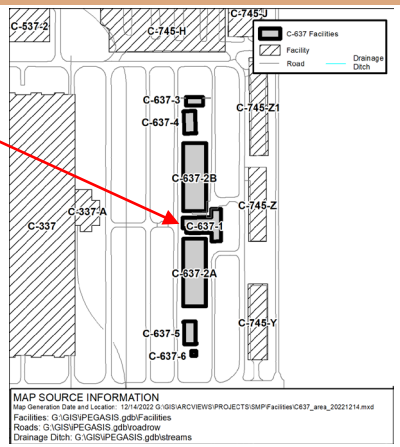
SWMU No.	Facility Name	Current Status
71	C-337-A Vaporizer (slab and underlying soils)	Soils and Slabs OU; Facility D&D OU
189	C-637 Septic System	No Further Action; KDWM 10/20/1993
190	C-337A Sewage Treatment Aeration Tank	No Further Action; KDWM 10/20/1993
526	Internal Plant Drainage Ditches (includes KPDES 016)	Surface Water OU

C-637-1 Pump House and Piping

C-637-1 Pump House and Piping

C-637-1 Pump House and Piping - Construction History

- C-637-1 Pump House and Piping facility is one of seven facilities located in SWMU 89.
- The facility was constructed in 1953/1954.
- C-637-1 is composed of three main structures (center structure, east wing, and west wing) on poured concrete foundations that vary from 6 to 21 inches in thickness.
  - The center structure is a single level, high-bay steel frame building with a built-up flat roof and exterior transite walls.
    - Garage-like structure with a roll-up door and pedestrian entrance.
    - Houses RCW pumps.
    - Wet well runs beneath the concrete floor.
    - External to the center structure is a wet well overflow/blowdown vault.
  - The east wing is a one-story concrete block building attached to the east side of the center structure.
    - East wing contains electrical switchgear room, battery room, restroom/shower/change area.
    - External to the east wing is a separate exterior concrete block wall with attached electrical transformers.
  - The west wing is a one-story concrete block building attached to the west side of the center structure.
    - West wing served as a chemical feed area with a loading dock/area.
    - Contains an acid room, Calgon room (e.g., chemical feed room), and a chlorine room with safety shower and eye wash station.
    - A mixing flume that connects the two influent flumes from the C-637-2A and C-637-2B cooling towers runs beneath the floor and is connected to the wet well.
    - Contained a laboratory bench area with sink (no longer present); drained to wet well.



C-637-1 - Pump House
West Wing View

C-637-1 - Pump House
Center Structure

Wet Well
Overflow/Blowdown Vault

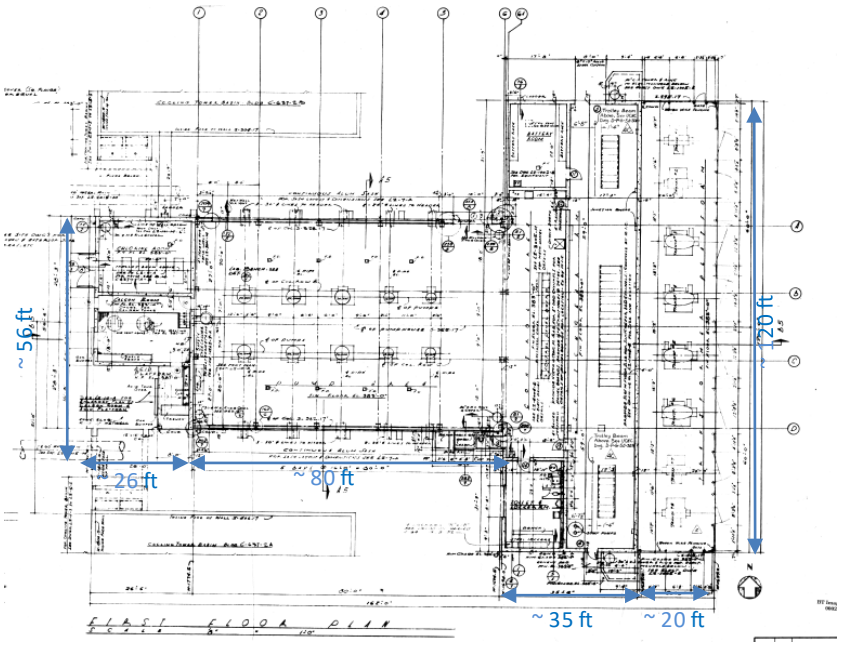
C-637-1 - Pump House
East Wing View

External Electrical
Transformers

C-637-1 Facility Photos: 2/2023

C-637-1 Pump House and Piping - Construction History

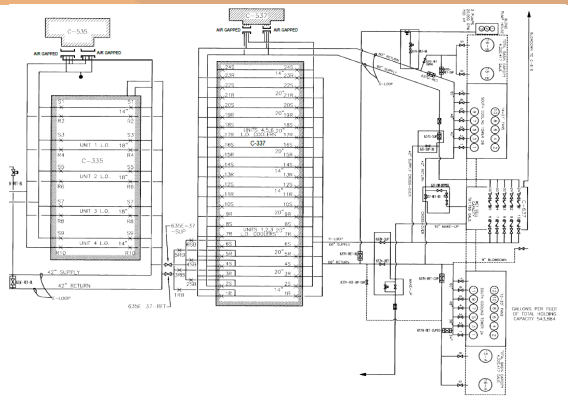
- The C-637-1 facility is approximately 12,536 ft^2 (includes external section attached to the east wing that houses the transformers).
  - The center structure is approximately 4,480 ft^2; measuring ~80 ft x ~56 ft.
    - Wet well beneath the entire center structure measuring ~27 ft deep (~ 791,789 gal capacity) with an external wet well overflow/blowdown vault measuring ~5 ft x ~18 ft located at a depth of ~6-7 ft.
    - Eight floor drains; four drain to the storm sewer system and four drain into the overflow pit and back into the wet well.
    - Two pressure relief valves located along the bottom of the wet well floor.
    - A laboratory sink (no longer present) that drains into the wet well.
  - The east wing is approximately 4,200 ft^2; measuring ~35 ft x ~120 ft.
    - Floor drains associated with battery room drain to the storm sewer system; floor drains associated with restroom/shower/change area drain to a septic tank and associated field tile.
    - External to the east wing structure is an additional outside concrete area approximately 2,400 ft^2; measuring ~20 ft x ~120 ft that houses nine electrical transformers.
  - The west wing is approximately 1,456 ft^2; measuring ~26 ft x ~56 ft.
    - Contains an mixing flume area measuring approximately ~26 ft x ~56 ft x ~9 ft located at a depth of ~20 ft that runs beneath the entire west wing (connects to the wet well located beneath the center structure).
      - Two influent flumes measuring ~ 14 ft x ~23 ft x ~9 ft each located at a depth of ~20 ft enter the mixing flume from the C-637-2A and C-637-2B cooling towers.
    - Three floor drains that drain into the wet well.



Floor Plan View: Excerpt from Engineering Drawing C-637-1 L2-2-A, dated 1959

C-637-1 Pump House and Piping - Operational History

- C-637-1 was originally built and operated as a pump house from its construction in 1953/1954 to 2013.
  - Pumped RCW from the wet well located beneath the pump house through 60-inch underground supply headers to the C-337 process building, C-360, and the C-537 Switchyard synchronous condensers.
  - Utilized 4 – 36-inch and 6 – 42-inch multi-stage deep well turbine pumps with 450 and 900 hp motors capable of 10,000 gallons per minute (gpm) and 20,000 gpm pumping rate, respectively.
    - The pumps, motors, and associated valves have been upgraded and/or replaced as needed to support operations.
  - Chlorine, sulfuric acid, and corrosion inhibitors were routinely fed into the RCW system via the wet well located beneath C-637-1.
    - Chorine was fed to control the growth of algae and other microbiological organisms.
    - Sulfuric acid was fed to control the pH or hydrogen ion concentration (Note: Soda ash was occasionally used on a non-routine basis for pH correction.)
    - Corrosion inhibitors were fed to help maintain piping and equipment integrity.
      (Note: For a brief period, prior to 1962, corrosion inhibitors also were dissolved in 500-gal stainless steel tanks; pumped into the plant water line at C-611, and introduced into the RCW system with make-up water.)



Excerpts from M5E-Z66150-E01, Rev 2

C-637-1 - Center Structure Pumps

Wet Well (located beneath the concrete)

C-637-1 Facility Photos: 2/2023

C-637-1 Pump House and Piping - Operational History

- Corrosion of the piping and heat exchanger units became a reoccurring problem within two years of cooling tower startup.
  - 1952 -1956 – a polyphosphate inhibitor (e.g., Calgon), focused on steel corrosion, was introduced into the RCW system.
    - Within two years severe pitting of the copper condenser tubes had progressed to complete penetration of the tube wall resulting in the loss of Freon-114 into the RCW.
  - 1956 – the RCW system was switched over to a polyphosphate-chromate inhibitor (dianodic inhibitor) effective against both steel and copper corrosion, but prone to fouling.
  - 1957 – an A-line cooling program was initiated to clean the condenser tube bundles; at this time the RCW system was switched to a zinc dianodic inhibitor (Orocol 155-Z), a polyphosphate-chromate inhibitor that contained about half the phosphate content and added zinc.
  - 1962 – further testing of the corrosion inhibitors was conducted in a pilot plant corrosion test loop in C-637; resulting in change to Betz Orocol TL, a polyphosphate-chromate inhibitor, which was used until the RCW system was converted to a phosphate system.
  - 1992/1993 – the RCW system (one cooling tower at a time) was converted from a chromate system to a phosphate system. [Note: In 1996 and 2000/2001 the RCW system was adjusted based on vendor product changes/updates (use of dispersant to help with the calcium phosphate depositing/scaling)].

C-637-1 - West Wing Calgon Room (Corrosion Inhibitor Feed Area)

C-637-1 - West Wing Chlorine Feed Header

C-637-1 - West Wing Sulfuric Acid Storage and Feed Area

C-637-1 – West Wing Sulfuric Acid Dock

C-637-1 Facility Photos: 2/2023

C-637-1 Pump House and Piping - Operational History

- In 1969, concrete walls were installed in between each of the transformers located outside of the west wing of C-637-1.
  - Walls were installed for fire protection.
- USEC leased the facility in the early 1990s and continued to use C-637-1 as a pump house until enrichment operations ceased at C-337 in 2013.
- In 1992, there was a polychlorinated biphenyl (PCB) leak from the drain associated with the 7PH6 transformer; < 5 ppm.
- In 1993, various PCB spills associated with the transformers occurred; all areas were addressed.
  - May - Leak from the 7PH1 transformer; approximately 5 gal.
  - August - Leak from the 7PH4 transformer; < 5 ppm.
- In November 1993, a cooling water line to the motor oil cooler at RCW pump #3 ruptured resulting in an RCW water and oil spill.
- In 2006, the #1 pump surge relief system developed an RCW leak from a small broken pipe; leak was addressed.

C-637-1 - East Wing External Transformers

C-637-1 – Center Structure RCW Pump #1

C-637-1 - East Wing Interior Switchgear Room

C-637-1 Facility Photos: 2/2023

C-637-1 Pump House and Piping - Operational History

- In 2012, there was a significant leak identified associated with the feed assembly.
  - Betz representatives replaced the feed assembly.
  - Area was cleaned and waste disposed.

- In 2013, C-637-1 was shutdown, along with its associated cooling towers (main cooling towers and blending towers).
  - Subsequent RCW leaks from pumps and associated lines occurred with some impact to the pad and surrounding drainage ditches.
  - The wet well and mixing flume were not drained and remained full of water. (Note: Draining has not occurred in order to prevent hydrostatic pressure changes that could cause collapse or floating of the subsurface structure.)

- In 2013, an RCW leak associated with the blowdown header was discovered in the switchgear room.
  - North end where the header penetrates the wall and goes into an elbow.
  - RCW leaked both inside and outside of the building.
  - As part of the corrective action the nearby storm drain was sealed off until the leak was repaired.

- C-637-1 transitioned from USEC to DOE in 2014.

C-637-1 - Center Wing
RCW Pumps and Discharge Lines

C-637-1 West Wing
Betz Chemical Feed Tank

C-637-1 Facility Photos: 2/2023

C-637-1 Pump House and Piping - Operational History

- In November 2017, solid waste exceeding Toxicity Characteristic Leaching Procedure (TCLP) limits for chromium, mercury, and lead was discovered in the bottom of the diked areas located within the cooling tower pump houses.
  - Waste was associated with the chemical tanks that contained corrosion inhibitors (including sulfuric acid).
  - Waste included crusty residues, sludges, liquids or a combination thereof.
  - Waste was removed and disposed in 2018.

C-637-1 West Wing
Diked Area beneath Corrosion Inhibitor Tanks

C-637-1 West Wing
Sulfuric Acid Pig and Tanks Location

C-637-1 Facility Photos: 2/2023

C-637-1 Pump House and Piping - Current Status

- C-637-1 is shutdown; the transformers no longer supply power to any facilities.

- Walkdown inspection conducted in February 2023 and employee interviews confirmed no unusual conditions.
  - Center Structure:
    - Houses RCW pumps.
    - Cement corrugated siding (transite).
    - Both asbestos-containing materials (ACM) and lead-based paints are known to be present.
    - Wet well runs beneath the concrete floor; chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the wet well (wet well remains full of water).
    - External to the center structure is a wet well overflow/blowdown vault.
    - Eight floor drains are present; four drain to the storm sewer system and four drain into the overflow pit and back into the wet well.
    - Laboratory bench area with sink (no longer present) and drain; drains to wet well.
    - Not used for radiological storage; the center structure of the facility does not contain any radiological postings.
    - No generator staging area (GSA) or satellite accumulation area (SAA).
    - Minor oil staining around several of the RCW pumps.
    - Chromated water leaks have occurred within the center structure of the facility.
    - Historical RCW leaks at #1 and #3 pumps (see slide 12).
    - No known chemical spills except for the above noted chromated water leaks and RCW leaks.

C-637-1 - Center Structure Electric RCW Pump Motor

C-637-1 - Center Structure No. 3 RCW Base/Open to Wet Well

C-637-1 - Center Structure Northeast Corner

C-637-1 - Center Structure Control Panel

C-637-1 - Center Structure Utility Lines along West Wall

C-637-1 - Center Structure Pump Oil Stain

C-637-1 - Center Structure Typical Floor Drain

C-637-1 Facility Photos: 2/2023

C-637-1 Pump House and Piping - Current Status

- Walkdown inspection conducted in February 2023 and employee interviews confirmed no unusual conditions (Continued).
  - East Wing:
    - Houses electrical switchgear room, battery room, and restroom/shower/change area.
    - Floor drains associated with battery room drain to the storm sewer; floor drains associated with the restroom/shower/change area drain to a septic tank and associated field tile.
    - 125-volt lead calcium batteries (60 cells) used for relay protection (no longer present).
    - Nine transformers (five - 480 V and four - 4160 V) with associated electrical switchgear; all have been air-gapped.
      - All have been drained.
      - Six of the nine transformer tanks are non-PCB (7PH1, 7PH2, 7PH3, 7PH7, 7PH8, and 7PH9); the three remaining transformer tanks contain PCBs < 50 ppm (7PH4, 7PH5, and 7PH6).
      - PCB spills have occurred (see slide 12).
      - Note: Transformers have been upgraded and replaced over the years.
    - Not used for radiological storage; the east wing of the facility does not contain any radiological postings.
    - No GSA or SAA.
    - Both ACM and lead-based paints are known to be present.
    - 2013 RCW leak associated with the blowdown header on the north end (see slide 13).
      - RCW leaked both inside and outside of the building.
    - No known chemical spills except for the above noted PCB spills and RCW leak.

C-637-1 - East Wing
Transformer Sprinkler System

C-637-1 – East Wing
Switchgear Room – Looking South

C-637-1 – East Wing
Battery Room Charger Entrance

C-637-1 - East Wing
Sanitary Water Supply

C-637-1 - East Wing
Restroom/shower/change area

C-637-1 – East Wing
Change House Locker Area

C-637-1 Facility Photos: 2/2023

C-637-1 Pump House and Piping - Current Status

- Walkdown inspection conducted in February 2023 and employee interviews confirmed no unusual conditions (Continued).
  - West Wing:
    - Houses chemical feed area, which is divided into three main sections: acid room (with loading dock), Calgon room, and a chlorine room.
    - Loading dock/area housed sulfuric acid pigs/day tanks.
    - Calgon room housed tanks of corrosion inhibitors; area within the dike contained solid waste exceeding TCLP limits for chromium, mercury, and lead that has been removed.
      - Betz feed assembly leak in 2012 (see slide 13).
    - Three floor drains are present; drain to wet well.
    - Contains a mixing flume located beneath the concrete (mixing flume remains full of water).
    - Manhole located in northwest corner of chlorine room.
    - Both ACM and lead-based paints are known to be present.
    - No GSAs or SAAs.
    - Not used for radiological storage; the west structure of the facility does not contain any radiological postings.
    - No known chemical spills except for the above noted Betz feed assembly leak in 2012 (see slide 13).

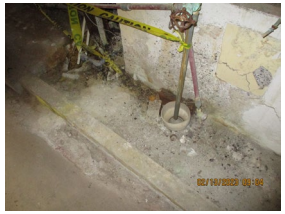
C-637-1 - West Wing
Calgon Area


C-637-1 - West Wing
Chlorine Monitor Cooler


C-637-1 - West Wing
Eye Wash and Corrosion Test Loop


C-637-1 - West Wing
Sulfuric Acid Storage and Feed Area


C-637-1 - West Wing
Containment Area Beneath
Chemical Tanks


C-637-1 -West Wing
Chemical Feed Point to
Wet Well


C-637-1 - West Wing
Chlorine Rotometer

C-637-1 Facility Photos: 2/2023

C-637-1 Pump House and Piping – Environmental Impacts

- No information to indicate a release or threatened release of a hazardous substance that would require a CERCLA evaluation for a potential response action for demolition of the aboveground structure to protect future public health or welfare or the environment.
  - C-637-1 has exclusively operated as a pump house that pumped RCW from the wet well located beneath the pump house through 60-inch underground supply headers to the C-337 process building, C-360, and the C-537 switchyard (synchronous condensers) from its construction in 1953/1954 to 2013.
  - Building materials used for construction could contain lead-based paints, ACM, and PCB-containing materials [e.g., C-637-1 has cement corrugated siding (transite), PCB transformers].
  - Building debris generated from demolition of the aboveground structures can be properly managed using standard demolition and waste management practices.

- Process knowledge and employee interviews indicate that the historical construction and system processes at C-637-1 involved equipment and chemicals that could have the potential to pose a release threat to the concrete pad and underlying soils. (See slide 6 for SWMU 89 details.)
  - Chromated water leaks have occurred; making the slab, underlying soils and surrounding area suspect for potential chromium contamination.
  - A wet well (currently full of water) runs beneath the concrete floor where chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the wet well.
    - Two pressure relief valves located along the bottom of the wet well floor.
  - A mixing flume (currently full of water) runs beneath the concrete floor where floor drains from the chlorine room, Calgon room, and acid room drained into the wet well.
  - Transformers located on the east side of the building contain PCBs; making the slab, underlying soils, and surrounding area suspect for potential PCB contamination.
  - Solid waste exceeding TCLP limits for chromium, mercury, and lead was discovered in the diked area located within the cooling tower pump house (waste was removed and disposed in 2018).

C-637-1 Pump House and Piping - Conclusion and Recommendations

- Walkdown inspection of the facility, employee interviews, and other reviewed historical information did not identify any unusual conditions that would pose a potential threat of environmental release during future demolition of the aboveground structure.
  - Deactivation will include removal of any accessible loose items being stored and certain equipment (e.g., pumps, motors, valves, electrical transformers and switchgear, etc.) (to the extent practicable) prior to demolition.
  - Any floor drains (along with the wet well, mixing flume, wet well overflow/blowdown vault, manholes, and supply/return lines) will be delineated, documented, and isolated prior to demolition.
  - An evaluation will be made to determine if any measures may be appropriate to stabilize and/or isolate the basement (or portions thereof) from the main floor prior to demolition. [Note: Measures other than mechanical isolation (one example of a measure other than mechanical isolation would be the addition of flowable fill) will require additional consultation with EPA and Kentucky.]
  - Water from the wet well and mixing flume will be evaluated for removal and proper disposal as part of deactivation and/or predemolition activities. (Note: Because the wet well and mixing flume are part of the underlying slab and soils that constitutes the SWMU, a SWMU notification, along with a SAR revision, will be performed documenting removal and disposal of the water associated with deactivation and/or predemolition activities.)

- Pending completion of deactivation and availability of funding, proceeding with demolition and disposal of the C-637-1 facility (aboveground structure) outside of the FFA/CERCLA process, contingent upon the fact that no additional changes have occurred that would affect the CERCLA determination of the facility prior to demolition, is recommended.

- All applicable laws, regulations, and DOE procedures/protocols will be followed to ensure the demolition and disposal of the aboveground structure occurs in a safe, compliant manner, including conducting any additional radiological characterization through confirmation radiological surveys (as necessary) to support demolition and waste disposition.

C-637-1 Pump House and Piping - Conclusion and Recommendations

- Based on the construction and historical use at C-637-1, demolition and disposal of the aboveground structure for C-637-1 is recommended to be conducted outside of the FFA/CERCLA process.

- As part of the demolition of the aboveground structure, the appropriate best management practices (BMPs) will be evaluated and implemented (as needed) to prevent/minimize the pooling and/or migration of storm water that may come into contact with any contamination that may exist on the pad/subsurface structure(s). For example, the following BMPs will be implemented as necessary:
  - Radiological surveying will occur following demolition.
  - Decontamination and/or application of fixatives and/or barriers to contaminated surfaces above regulatory posting limits.
  - Isolation measures and other types of barriers to minimize and/or control runoff/pooling of contaminated storm water [e.g., seal inlets to drains/sumps/subsurface structure(s)].

- Removal of the C-637-1 facility from the Facility D&D OU will be documented in the appropriate annual SMP revision.

- Based on the construction and historical use at C-637-1, it is recommended that the underlying slab and soils undergo further CERCLA evaluation as part of Soils and Slabs OU as currently identified in Appendix 4 of the SMP.
  - The SAR for SWMU 89 will be updated to clarify that the C-637-1 underlying slab and associated soils constitutes the SWMU and will undergo a remedial field investigation as part of the Soils and Slabs OU.
  - Consideration will be given to coordinate the timing for issuance and finalization of a revised SAR for SWMU 89 that includes updated information on C-637-1 prior to removal of the aboveground structure.

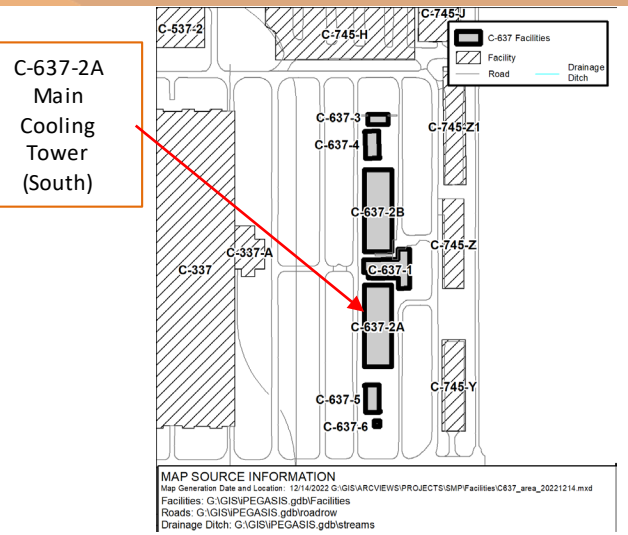
C-637-2A (South) Cooling Tower

C-637-2A (South) Cooling Tower

C-637-2A (South) Cooling Tower - Construction History

- C-637-2A Cooling Tower facility is one of seven facilities located in SWMU 89.
- The facility was originally constructed in 1953/1954.
- The facility is a wood frame structure (originally approximately 41 ft tall) resting on a 2-ft thick poured concrete pier-type foundation; a deck roof with railing and fan shrouds; and exterior walls of corrugated panels.
  - Often referred to as a "main cooling tower."
  - Supports 7 pairs of back-to-back cooling tower cells; total of 14 cooling tower cells. (Note: Modified in 1993 to 6 pairs of back-to-back cooling tower cells; decreasing the number of fans/risers.)
    - Each cell operates independently of the other cells.
    - Each cell has a fan and driving motor; total of 14 fans/driving (modified to 12 in 1993).
    - Fans are enclosed by protective shrouds.
    - One riser serves each pair of back-to-back cells; total of 7 risers (modified to 6 in 1993).
    - The tower contains a water distribution system (including lateral flush lines), cold water fill (system of baffles), and mist eliminators.
    - Piping and sprinklers for fire protection throughout.
  - Cools RCW and returns it to the below grade collection basin.
    - Footprint of the basin is larger than the aboveground footprint of the cooling tower; extending an additional 177 ft south of the cooling tower (this section has a concrete slab top).
    - Basin is open and visible.
    - Influent flume located on the northwest corner (exterior to the basin).
    - Sixteen pressure relief valves located along the bottom of basin floor.

C-637-2A Main Cooling Tower (South)



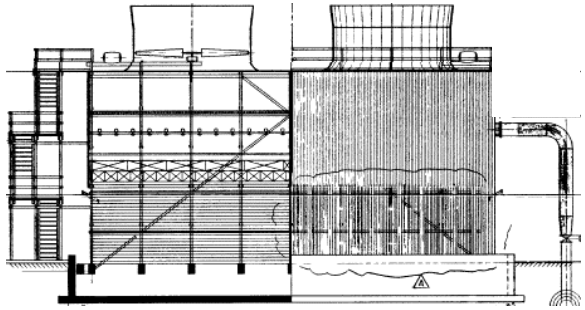
C-637-2A Cooling Tower – East Side

C-637-2A Facility Photo: 2/2023

C-637-2A (South) Cooling Tower - Construction History

- C-637-2A Cooling Tower facility (Continued)
  - Houses the beginning of an influent flume.
    - Influent flume exits the northwest corner of the basin of the cooling tower; connecting the cooling tower basin to the mixing well located in C-637-1 pump house.
  - West side infrastructure.
    - Seven water riser pipes (modified to 6 in 1993); connect into the below grade piping system.
    - Two external concrete buildings; house the fire sprinkler system.
    - Fire protection connection; southwest corner.
    - Twenty-two vaults are located within the footprint of the two main cooling towers with eleven supporting C-637-2A (See slide 25 for details).
  - East side infrastructure.
    - Two exterior wood staircases; one located on the south end and one located on the north end.
    - Lateral flush lines and connections.
    - Power supplies.
  - Roof infrastructure.
    - Wood decking with railing that extends the circumference of the tower.
    - Support fans enclosed with protective shrouds.

Historical Photo of Cooling Tower Roof Deck and Shrouds



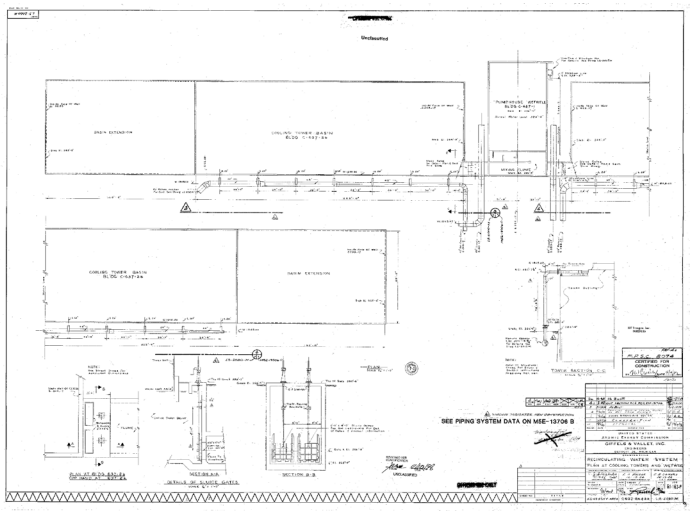
Internal Cooling Tower Components
Excerpt from Engineering Drawing HUC3403-001-01

C-637-2A Cooling Tower West Side

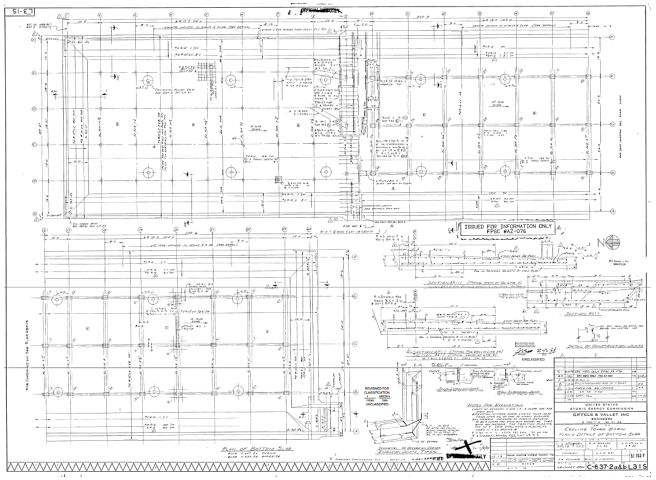
C-637-2A Facility Photo: 2/2023

C-637-2A (South) Cooling Tower - Construction History

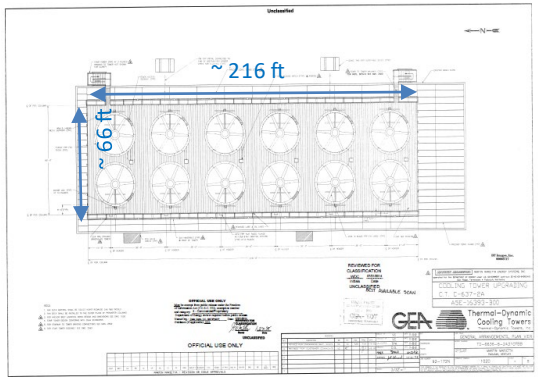
- The C-637-2A facility (aboveground structure) is approximately 14,256 ft^2; measuring ~66 ft x ~216 ft.
  - Collection basin (underground) measuring ~87 ft x ~393 ft x ~15 ft (~ 4,220,417 gal capacity).
    - Footprint is larger than the aboveground footprint of the C-637-2A cooling tower; extending an additional 177 ft south of the C-637-2A cooling tower (this section has a concrete slab top).
  - Influent flume exiting the basin measuring ~14 ft x ~23 ft x ~9 ft located to a depth of ~20 ft.
    - Runs underground from the cooling tower basin to the C-637-1 pump house mixing flume, which in turn enters into the wet well.
  - Two external concrete buildings measuring ~6 ft 8 inches x ~10 ft 8 inches x ~9 ft.
    - Houses the fire sprinkler system.
    - Located within footprint of main cooling tower.



Excerpt of Engineering Drawing of C-637-2A & 2B Layout; L3-2000M, dated 1953



Excerpt of Engineering Drawing of C-637-2A & 2B Layout; L3-1-S, dated 1953



Excerpt of Engineering Drawing of C-637-2A Layout; A5E-16393-B00, dated 1993

C-637-2A (South) Cooling Tower - Construction History

- The C-637-2A facility is approximately 14,256 ft^2. (Continued)
  - Twenty-two vaults are located within the footprint of the two main cooling towers with eleven supporting C-637-2A.
    1. H-Loop Return to Blending Tower Crossover
       a. Located within footprint of main cooling tower; installed as part of blending towers in 1975/1976.
    2. H-Loop Return to Blending Tower
       a. Located within footprint of main cooling tower; installed as part of blending towers in 1975/1976.
    3. H-Loop Return Bypass/H-Loop Return/H-Loop Supply
    4. Make-up Venturi
    5. Plant Water Valves
    6. H-Loop Return Bypass
    7. H-Loop Return Bypass to Blending Tower
       a. Located within footprint of main cooling tower; installed as part of blending towers in 1975/1976.
    8. H-Loop Supply Venturi
    9. Instrument Connection Vault
    10. Former High Pressure Fire Water (HPFW) Vault
    11. Flume/Sluice Gate
        a. Housed influent flume (connects to mixing flume in C-637-1).
        b. Housed two flume sluice gates.
  - Note: Historically these types of vaults have been known to contain sump pumps; therefore, it is assumed that there has been drainage to the surrounding soils during past operations.

H-Loop Return to Blending Tower Crossover Vault

H-Loop Return to Blending Tower Vault

H-Loop Return Bypass/H-Loop Return/H-Loop Supply Vault

Make-up Venturi Vault

Plant Water Valves Vault

H-Loop Return Bypass Vault

H-Loop Return Bypass to Blending Tower Vault

H-Loop Supply Venturi Vault

Instrument Connection Vault (Round Vault in Background)

Former HPFW Vault

Flume/Sluice Gate Vault

C-637-2A Facility Photos: 2/2023 and 3/2023

C-637-2A (South) Cooling Tower - Operational History

- C-637-2A was originally built and operated as a cooling tower from its construction in 1953/1954.
  - Heated RCW from the C-337 process building, C-360, and the C-537 switchyard (synchronous condensers) and groundwater from the Northeast Plume (beginning in 1997) was distributed through various sections of the cooling tower and released via evaporation; cooled RCW was then collected into the cooling tower basin where it then flowed by gravity via an influent flume into the mixing flume and wet well located underneath the C-637-1 pump house.
  - Tower was demolished down to the basin and rebuilt in the 1993-1994 timeframe.

- Brown rot fungi growth quickly became a problem for the cooling towers.
  - In 1958, a program was initiated to combat fungus deterioration.
  - Replaced infected wood with new pressure treated redwood.
    - Cooling tower structural members, fill, mist eliminators, outer wall, cell partitions, and deck were originally constructed of California redwood.
  - Treated remaining wood with fungicide solutions (most susceptible areas only).
  - All cell plenum chambers, tower deck, outer sidewalls, and tower tops were treated periodically with one of two types of fungicide solutions:
    - Sodium pentachlorophenate.
    - Double diffusion method – first spraying with a solution of zinc sulphate and arsenic acid followed by a second spraying with a solution of sodium bichromate.
  - Fungicide treatment was discontinued in 1987.

C-637-2A Cooling Tower – South Side

C-637-2A Cooling Tower – Interior View

C-637-2A Facility Photos: 2/2023

C-637-2A (South) Cooling Tower - Operational History

- In 1972, the main cooling towers underwent restoration.
  - Restoration was limited; engineering drawings indicate that certain structural members were only removed if necessary. (Note: Mechanical repairs to motors, gear boxes, etc., also occurred over the years of operation.)
- Between 1975 – 1977 firewater/sprinkler systems were upgraded.
- In 1978, new wind baffling was installed.
- In 1979, a cooling tower drift study was conducted to determine the impact of chromium dispersion from the cooling towers.
  - Vegetation survey provided evidence of long-term transport and disposition of chromium to terrestrial ecosystem components.
    - Decrease in concentration with distance; most disposition is confined to DOE property.
  - Chromium deposited by drift to soils or lost to soils from vegetation does not accumulate significantly beyond 200 meters from the towers.
    - Soil chromium is the less soluble and less biologically active oxidation state (Cr^{+3}).

C-637-2A Sprinkler System - External View

C-637-2A Sprinkler System - Internal View

C-637-2A Facility Photos: 2/2023

C-637-2A (South) Cooling Tower - Operational History

- In 1980, water from the cooling tower basin overflowed to Little Bayou Creek resulting in a EPA issued NPDES violation. (Note: Report does not specify which cooling tower; C-637-2A or C-637-2B.) (ASER 1980)

- In 1981, RCW sprinkler alarms were installed.

- In 1985, the overfeeding of non-chromated water to the C-637 cooling tower basin allowed water to flow to Little Bayou Creek. (Note: Report does not specify which cooling tower; C-637-2A or C-637-2B.) (ASER 1985)
  - 3,000 gal of water containing 9 ppm Cr^{+6}.
  - NPDES permit was not violated. (Note: First KPDES permit issued in 1986.)

- In 1988, a broken 1½-inch recirculating water line released an unknown quantity of water to the surrounding area. (Note: Report does not specify which cooling tower; C-637-2A or C-637-2B). (ASER 1988)
  - Water contained approximately 9 mg/L Cr^{+6}.
  - Most of the water was contained in a ditch near the tower equipped with a pump to return the water back to the system.
  - Subsequent sampling indicated that little or no chromated water was released off-site.

C-637-2A Cooling Tower – Northeast Corner

C-637-2A Cooling Tower – Basin

C-637-2A Facility Photos: 2/2023

C-637-2A (South) Cooling Tower - Operational History

- USEC leased the facility in the early 1990s and continued to use C-637-2A as a cooling tower until enrichment operations ceased at C-337.

- In 1993-1994, the main cooling tower was replaced down to the basin.
  - The overall footprint of the cooling tower was adjusted and the height, length and width of the new cooling tower was reduced.
    - Height reduced from approximately 41 ft to approximately 31 ft.
    - Length reduced from approximately 252 ft to approximately 216 ft.
    - Width reduced from approximately 84 ft to approximately 66 ft.
      - Modified from 7 to 6 pairs of back-to-back cooling tower cells; total of 12 rather than 14 cooling tower cells.
      - Modified from 7 risers to 6 risers.
  - Downsized because the cooling tower load designed for in the 1950s was not required for C-337 and the new tower design was more efficient.

Historical photo of main cooling tower replacement project
(Photo of C-637 Main Cooling Tower)

C-637-2A (South) Cooling Tower - Operational History

- In 1997, the Northeast Plume Containment System became operational.
  - The Record of Decision was signed by DOE and EPA in June 1995.
  - Characterization and construction activities were completed in 1996.
    - Remedial action system consisted of two extraction wells, an equalization tank, a transfer pump, a transfer pipeline and instrumentation and controls.
    - System operation included pumping groundwater contaminated with trichloroethene (TCE) from two extraction wells to an equalization tank where a transfer pump was used to pump the groundwater from the equalization tank through approximately 6,000 linear feet of transfer line to the C-637 cooling tower. (Note: At C-637-2A groundwater entered the cooling tower via riser #6.)
  - Cooling tower acted as an air stripper to remove TCE from the groundwater.
    - Initially only the C-637-2A cooling tower was used; however, additional piping and valves were installed to also allow the use of the C-637-2B tower if needed.
  - In 2013, an alternate treatment unit was installed to support the NE plume containment system, replacing the use of the C-637 cooling towers.
    - A three-way valve station was installed in the transfer line to allow extracted groundwater to be diverted to either the new alternate treatment unit system or the C-637 cooling towers for air stripping.
    - Piping located at the C-637-2A and C-637-2B cooling towers was air gapped.

C-637-2A – Cooling Tower Northeast Plume Pump and Treat Lines (Air-gapped)

C-637-2A Cooling Tower Northeast Plume Pump and Treat Line to Riser No. 6

C-637-2A Facility Photos: 2/2023

C-637-2A (South) Cooling Tower - Operational History

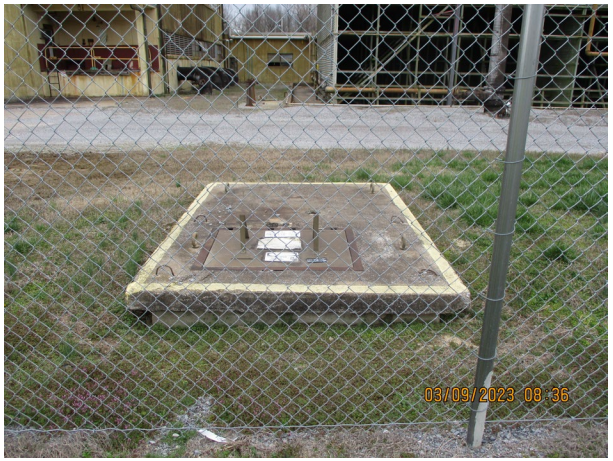
- In 2010, while pumping residual RCW from a diked area to the basin a leak developed on a hose connection spilling approximately 3-5 gal of RCW residual onto the ground.

- In 2011, a leak associated with RCW H-Loop Return to Blending Tower valve was discovered; valve was replaced.

- In 2012, two system leaks occurred.
  - April - An RCW leak associated with RCW H-Loop Return to Blending Tower vault.
    - Vault was pumped and leak repaired.
  - September - A water leak occurred below the #6 riser block valve where the NE Plume Containment piping tied into the riser between the riser and valve HV-184.
    - Leak was minor and repaired immediately.

- In 2013, C-637-2A was shutdown, along with its associated pump house and blending towers.
  - The basin and influent flume have not been drained and remain full of water; draining has not occurred in order to prevent hydrostatic pressure changes that could cause collapse or floating of the subsurface structure. [Note: The basin has been lowered, filled with makeup water in order to decrease the amount of phosphate remaining in the basin (phosphate value of <1 ppm), and calcium hypochlorite tablets are added once a month to keep the water from becoming septic.]

- C-637-2A transitioned from USEC to DOE in 2014.



H-Loop Return to Blending Tower Vault

West Side Risers

C-637-2A Facility Photos: 2/2023 and 3/2023

C-637-2A (South) Cooling Tower - Current Status

- Walkdown inspections conducted in February and March 2023 and employee interviews confirmed no unusual conditions.
  - Both ACM (e.g., transite siding) and lead-based paints are known to be present.
  - Basin located beneath the cooling tower contains sixteen pressure release valves.
  - Houses an influent flume that remains full of water and exits at the bottom of the basin of the cooling tower; northwest corner.
    - Chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the C-637-1 wet well and would be present in the basin.
  - Eleven vaults located within the footprint of the C-637-2A cooling tower; some contain sump pumps.
  - Served as an air stripper for the NE Plume Containment System; removing TCE from the groundwater (see slide 30).
  - Two external concrete buildings; house the fire sprinkler system.
  - Not used for radiological storage; no radiological postings are present.
  - No GSA or SAA.
  - Historical use of sodium pentachlorophenate; zinc sulphate; arsenic acid; and sodium bichromate for fungicide treatment of wood.
  - Historical chromated water leaks have occurred and were immediately addressed (see slides 27, 28, and 31).
  - No known chemical spills except for chromated water leaks.

C-637-2A – Fire Protection Connection Point

C-637-2A – South and East Side Concrete Basin Roof

C-637-2A - Flush Line Connections

C-637-2A – North End (Sluice Gates)

C-637-2A –Riser No. 1 and Bypass Line

C-637-2A – West Side Concrete Roof Basin and Risers

C-637-2A Facility Photos: 2/2023

C-637-2A (South) Cooling Tower - Environmental Impacts

- No information to indicate a release or threatened release of a hazardous substance that would require a CERCLA evaluation for a potential response action for demolition of the aboveground structure to protect future public health or welfare or the environment.
  - C-637-2A has exclusively operated as the main cooling tower; cooling heated RCW from the C-337 process building, C-360, and the C-537 switchyard (synchronous condensers) from its construction in 1953/1954 to 2013 and removing TCE from groundwater from 1997 to 2013.
  - Building materials used for construction could contain lead-based paints and ACM (e.g., corrugated transite siding).
    - Because the cooling tower was completely rebuilt (wood removed down to basin) in the 1993/1994 timeframe, chemicals used for fungicide treatment prior to 1987 are no longer a concern for the existing wood.
    - In 1992/1993, the RCW system was converted from a chromate system to a phosphate system.
  - Building debris generated from demolition of the aboveground structures can be properly managed using standard demolition and waste management practices.

- Process knowledge and employee interviews indicate that the historical construction and system processes at C-637-2A involved equipment and chemicals that could have the potential to pose a release threat to the basin and associated vaults and underlying soils (including the surrounding area associated with the basin/vaults). (See slide 6 for SWMU 89 details.)
  - Chromated water releases and airborne dispersion of chromium have occurred; making the underlying soils and surrounding area suspect for potential chromium contamination.
  - Historical fungicide treatment of wood; making the underlying soils suspect for potential contamination.
  - Served as an air stripper for the NE Plume Containment System; removing TCE from the groundwater.
  - Sixteen pressure release valves are located along the bottom of the basin floor.
  - Basin (currently full of water) is connected to the C-637-1 pump house via an influent flume (currently full of water).
    - Chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the C-637-1 wet well and would be present in the basin (Note: Soda ash was occasionally used on a non-routine basis for pH correction).
  - Eleven vaults located within the footprint of the cooling tower. Historically these types of have been known to contain sump pumps; therefore, it is assumed that there has been drainage to the surrounding soils during past operations.

C-637-2A (South) Cooling Tower - Conclusion and Recommendations

- Walkdown inspection of the facility, employee interviews, and other reviewed historical information did not identify any unusual conditions that would pose a potential threat of environmental release during future demolition of the aboveground structure.
  - Deactivation will include removal of any accessible loose items being stored and certain equipment (e.g., risers, fans, fan motors, and shrouds, etc.) (to the extent practicable) prior to demolition.
  - Any floor drains (along with the vaults, sumps, influent flume, and supply/return lines) will be delineated, documented, and isolated prior to demolition.
  - An evaluation will be made to determine if any measures may be appropriate to stabilize and/or isolate the basin (or portions thereof) from the main floor of the cooling tower prior to demolition. [Note: Measures other than mechanical isolation (one example of a measure other than mechanical isolation would be the addition of flowable fill) will require additional consultation with EPA and Kentucky.]
  - Water from the basin and influent flume will be evaluated for removal and proper disposal as part of deactivation and/or predemolition activities. (Note: Because the basin and influent flume are part of the underlying slab and soils that constitutes the SWMU, a SWMU notification, along with a SAR revision, will be performed documenting removal and disposal of the water associated with deactivation and/or predemolition activities.)

- Pending completion of deactivation and availability of funding, proceeding with demolition and disposal of the C-637-2A facility (aboveground structure) outside of the FFA/CERCLA process, contingent upon the fact that no additional changes have occurred that would affect the CERCLA determination of the facility prior to demolition, is recommended.

- All applicable laws, regulations, and DOE procedures/protocols will be followed to ensure the demolition and disposal of the aboveground structure occurs in a safe, compliant manner, including conducting any additional radiological characterization through confirmation radiological surveys (as necessary) to support demolition and waste disposition.

C-637-2A (South) Cooling Tower - Conclusion and Recommendations

- Based on the construction and historical use at C-637-2A, demolition and disposal of the aboveground structure for C-637-2A is recommended to be conducted outside of the FFA/CERCLA process.

- As part of the demolition of the aboveground structure, the appropriate BMPs will be evaluated and implemented (as needed) to prevent/minimize the pooling and/or migration of storm water that may come into contact with any contamination that may exist on the pad/subsurface structure(s). For example, the following BMPs will be implemented as necessary:
  - Radiological surveying will occur following demolition.
  - Decontamination and/or application of fixatives and/or barriers to contaminated surfaces above regulatory posting limits.
  - Isolation measures and other types of barriers to minimize and/or control runoff/pooling of contaminated storm water [e.g., seal inlets to drains/sumps/subsurface structure(s)].

- Removal of the C-637-2A facility from the Facility D&D OU will be documented in the appropriate annual SMP revision.

- Based on the construction and historical use at C-637-2A, it is recommended that the underlying slab and soils (including surrounding soils within the C-637-2A footprint) undergo further CERCLA evaluation as part of Soils and Slabs OU as currently identified in Appendix 4 of the SMP.
  - The SAR for SWMU 89 will be updated to clarify that the C-637-2A underlying slab and associated soils (including surrounding soils within the C-637-2A footprint) constitutes the SWMU and will undergo a remedial field investigation as part of the Soils and Slabs OU.
  - Consideration will be given to coordinate the timing for issuance and finalization of a revised SAR for SWMU 89 that includes updated information on C-637-2A prior to removal of the aboveground structure.

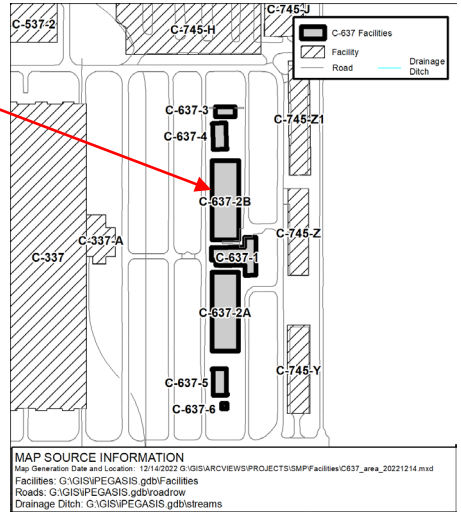
C-637-2B (North) Cooling Tower

C-637-2B (North) Cooling Tower

C-637-2B (North) Cooling Tower - Construction History

- C-637-2B Cooling Tower facility is one of seven facilities located in SWMU 89.
- The facility was originally constructed in 1953/1954.
- The facility is a wood frame structure (originally approximately 41 ft tall) resting on a 2-ft thick poured concrete pier-type foundation; a deck roof with railing and fan shrouds; and exterior walls of corrugated panels.
  - Often referred to as a "main cooling tower."
  - Supports 7 pairs of back-to-back cooling tower cells; total of 14 cooling tower cells. (Note: Modified in 1993 to 5 pairs of back-to-back tower cells; total of 10 cooling tower cells; decreasing the number of fans/risers.)
    - Each cell operates independently of the other cells.
    - Each cell has a fan and driving motor; total of 14 fans/driving (modified to 10 in 1993).
    - Fans are enclosed by protective shrouds.
    - One riser serves each pair of back-to-back cells; total of 7 risers (modified to 5 in 1992).
    - The tower contains a water distribution system (including lateral flush lines), cold water fill (system of baffles), and mist eliminators.
    - Piping and sprinklers for fire protection throughout.
  - Cools RCW and returns it to the below grade collection basin.
    - Footprint of the basin is larger than the aboveground footprint of the cooling tower; extending an additional 214 ft north of the cooling tower (this section has a concrete slab top).
    - Basin is open and visible.
    - Influent flume located on the southwest corner (exterior of basin).
    - Sixteen pressure relief valves located along the bottom of basin floor.

C-637-2B Main Cooling Tower (North)



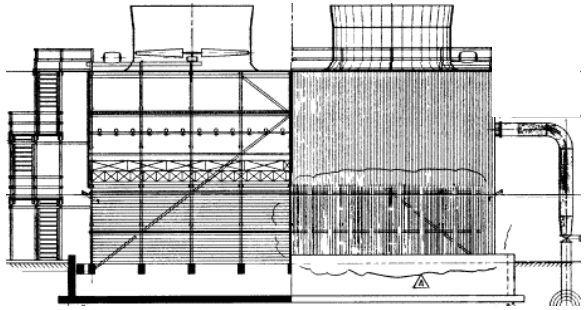
C-637-2B Cooling Tower – East Side

C-637-2B Facility Photo: 2/2023

C-637-2B (North) Cooling Tower - Construction History

- C-637-2B Cooling Tower facility (Continued)
  - Houses the beginning of an influent flume.
    - Influent flume exits the southwest corner of the basin of the cooling tower; connecting the cooling tower basin to the mixing well located in C-637-1 pump house.
  - West side infrastructure.
    - Seven water riser pipes (modified to 5 in 1993); connect into the below grade piping system.
    - Two external concrete buildings; house the fire sprinkler system.
    - Twenty-two vaults are located within the footprint of the two main cooling towers with eleven supporting C-637-2B (See slide 40 for details).
  - East side infrastructure.
    - One exterior wood staircase; located on the north end.
    - Lateral flush lines and connections.
    - Power supplies.
  - South side infrastructure.
    - One exterior wood staircase.
  - Roof infrastructure.
    - Wood decking with railing that extends the circumference of the tower.
    - Support fans enclosed with protective shrouds.

Historical Photo of Cooling Tower Roof Deck and Shrouds



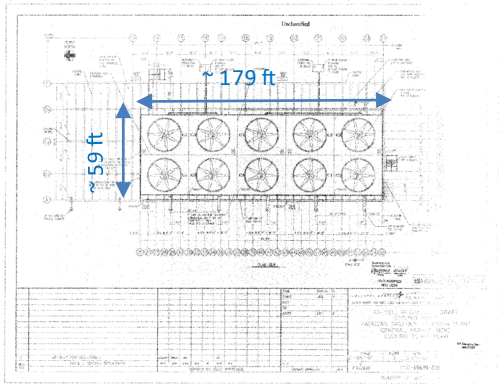
Internal Cooling Tower Components
Excerpt from Engineering Drawing HUC3403-001-01

C-637-2B Cooling Tower West Side

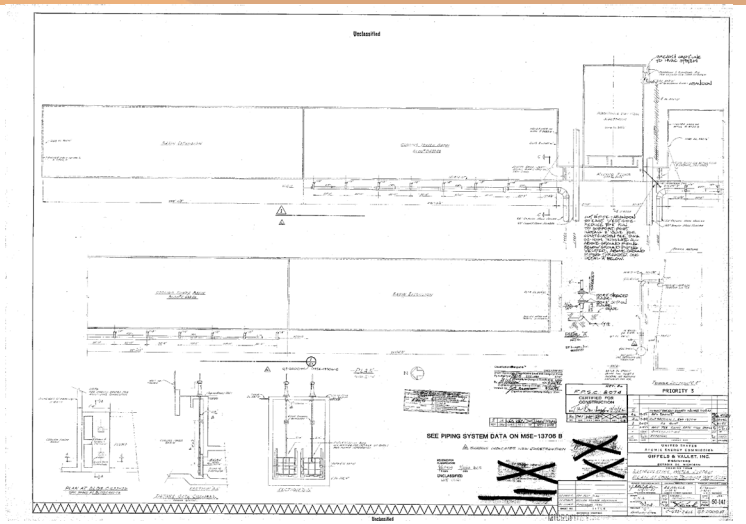
C-637-2B Facility Photo: 2/2023

C-637-2B (North) Cooling Tower - Construction History

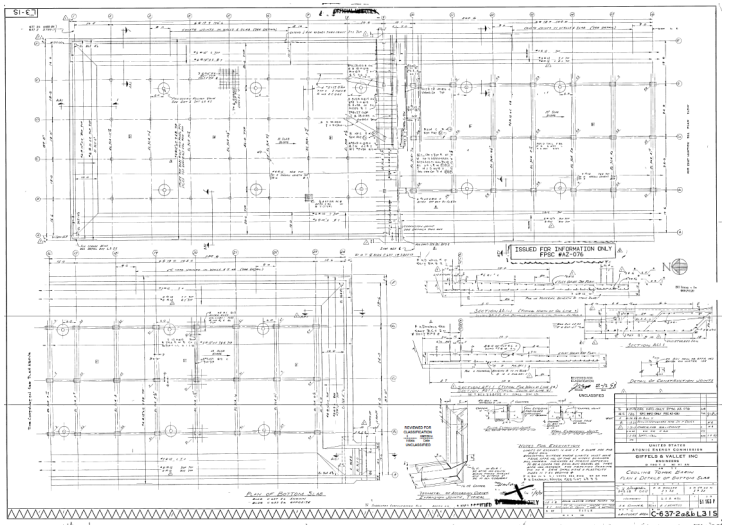
- The C-637-2B facility (aboveground structure) is approximately 10,561 ft^2; measuring ~59 ft x ~179 ft.
  - Collection basin (underground) measuring ~87 ft x ~393 ft x ~15 ft (~ 4,220,417 gal capacity).
    - Footprint is larger than the aboveground footprint of the C-637-2B cooling tower; extending an additional 214 ft north of the C-637-2B cooling tower (this section has a concrete slab top).
  - Influent flume exiting the basin measuring ~14 ft x ~23 ft x ~9 ft located to a depth of ~20 ft.
    - Runs underground from the cooling tower basin to the C-637-1 pump house mixing flume, which in turn enters into the wet well.
  - Two external concrete buildings measuring ~6 ft 8 inches x ~10 ft 8 inches x ~9 ft.
    - Houses the fire sprinkler system.
    - Located within footprint of main cooling tower.



Excerpt of Engineering Drawing of C-637-2B Layout; C5C-19691-S01, dated 1993



Excerpt of Engineering Drawing of C-637-2A & 2B Layout; L3-2000M, dated 1953



Excerpt of Engineering Drawing of C-637-2A & 2B Layout; L3-1-S, dated 1953

C-637-2B (North) Cooling Tower - Construction History

- The C-637-2B facility is approximately 10,561 ft^2. (Continued)

  - Twenty-two vaults are located within the footprint of the two main cooling towers with eleven supporting C-637-2B.
    1. 37N
    2. G-Loop Return Bypass
    3. G-Loop Return to Blending Tower Crossover
       a. Located within footprint of main cooling tower; installed as part of blending towers in 1975/1976.
    4. G-Loop Return
    5. G-Loop Return to Blending Tower
       a. Located within footprint of main cooling tower; installed as part of blending towers in 1975/1976.
    6. Instrument Connection Vault
    7. G-Loop Supply Venturi
    8. G-Loop Supply/G-Loop Supply Crossover
    9. Return Crossover
    10. Former HPFW Vault
    11. Flume/Sluice Gate
        a. Housed influent flume (connects to mixing flume in C-637-1).
        b. Housed two flume sluice gates.

  - Note: Historically these types of vaults have been known to contain sump pumps; therefore, it is assumed that there has been drainage to the surrounding soils during past operations.

37N Vault

G-Loop Return Bypass Vault

G-Loop Return Blending Tower Crossover Vault

G-Loop Return Vault

G-Loop Return to Blending Tower Vault

Instrument Connection Vault

G-Loop Supply Venturi Vault

G-Loop Supply/G-Loop Supply Crossover Vault

Return Crossover Vault

HPFW Vault

Flume/Sluice Gate Vault

C-637-2B Facility Photos: 2/2023 and 3/2023

C-637-2B (North) Cooling Tower - Operational History

- C-637-2B was originally built and operated as a cooling tower from its construction in 1953/1954.
  - Heated RCW from the C-337 process building, C-360, and the C-537 switchyard (synchronous condensers) and groundwater from the Northeast Plume (beginning in 1997) was distributed through various sections of the cooling tower and released via evaporation; cooled RCW was then collected into the cooling tower basin where it then flowed by gravity via an influent flume into the mixing flume and wet well located underneath the C-637-1 pump house.
  - Tower was demolished down to the basin and rebuilt in the 1996-1997 timeframe.

C-637-2B Cooling Tower – North Side

- Brown rot fungi growth quickly became a problem for the cooling towers.
  - In 1958, a program was initiated to combat fungus deterioration.
  - Replaced infected wood with new pressure treated redwood.
    - Cooling tower structural members, fill, mist eliminators, outer wall, cell partitions, and deck were originally constructed of California redwood.
  - Treated remaining wood with fungicide solutions (most susceptible areas only).
  - All cell plenum chambers, tower deck, outer sidewalls, and tower tops were treated periodically with one of two types of fungicide solutions:
    - Sodium pentachlorophenate.
    - Double diffusion method – first spraying with a solution of zinc sulphate and arsenic acid followed by a second spraying with a solution of sodium bichromate.
  - Fungicide treatment was discontinued in 1987.

C-637-2B Cooling Tower – Interior View

C-637-2B Facility Photos: 2/2023

C-637-2B (North) Cooling Tower - Operational History

- In 1972, the main cooling towers underwent restoration.
  - Restoration was limited; engineering drawings indicate that certain structural members were only removed if necessary. (Note: Mechanical repairs to motors, gear boxes, etc., also occurred over the years of operation.)
- Between 1975 – 1977 firewater/sprinkler systems were upgraded.
- In 1978, new wind baffling was installed.
- In 1979, a cooling tower drift study was conducted to determine the impact of chromium dispersion from the cooling towers.
  - Vegetation survey provided evidence of long-term transport and disposition of chromium to terrestrial ecosystem components.
    - Decrease in concentration with distance; most disposition is confined to DOE property.
  - Chromium deposited by drift to soils or lost to soils from vegetation does not accumulate significantly beyond 200 meters from the towers.
    - Soil chromium is the less soluble and less biologically active oxidation state (Cr^{+3}).
- In 1980, water from the cooling tower basin overflowed to Little Bayou Creek resulting in a NPDES violation. (Note: Report does not specify which cooling tower; C-637-2A or C-637-2B.) (ASER 1980)

C-637-2B Sprinkler System - External View

C-637-2B Sprinkler System - Internal View

C-637-2B Facility Photos: 2/2023

C-637-2B (North) Cooling Tower - Operational History

- In 1981, RCW sprinkler alarms were installed.
- In 1985, the overfeeding of non-chromated water to the C-637 cooling tower basin allowed water to flow to Little Bayou Creek. (ASER 1985) (Note: Report does not specify which cooling tower; C-637-2A or C-637-2B).
  - 3,000 gal of water containing 9 ppm Cr^{+6}.
  - NPDES permit was not violated.
- In 1988, a broken 1½-inch recirculating water line released an unknown quantity of water to the surrounding area. (ASER 1988) (Note: Report does not specify which cooling tower; C-637-2A or C-637-2B).
  - Water contained approximately 9 mg/L Cr^{+6}.
  - Most of the water was contained in a ditch near the tower equipped with a pump to return the water back to the system.
  - Subsequent sampling indicated that little or no chromated water was released off-site.
- In 1990, PGDP submitted a construction permit application to KDAQ for upgrading the C-637-2B cooling tower. (ASER 1990)
  - The KDAQ Permit Review Branch subsequently determined that the work to be performed on the C-637-2B tower and the work performed on other towers did not require construction permits.

C-637-2B Cooling Tower – Northeast Side

C-637-2B Cooling Tower –West Side
(Area between Basin and Fire Sprinkler Houses)

C-637-2B Facility Photos: 2/2023

C-637-2B (North) Cooling Tower - Operational History

- USEC leased the facility in the early 1990s and continued to use C-637-2B as a cooling tower until enrichment operations ceased at C-337.

- In 1996-1997, the main cooling tower was replaced down to the basin.
  - The overall footprint of the cooling tower was adjusted and the height, length, and width of the new cooling tower was reduced.
    - Height reduced from approximately 41 ft to approximately 31 ft.
    - Length reduced from approximately 252 ft to approximately 179 ft.
    - Width reduced from approximately 84 ft to approximately 59 ft.
      - Modified from 7 to 5 pairs of back-to-back cooling tower cells; total of 10 rather than 14 cooling tower cells.
      - Modified from 7 risers to 5 risers.
  - Downsized because the cooling tower load designed for in the 1950s was not required for C-337 and the new tower design was more efficient.

Historical photo of main cooling tower replacement project
(Photo of C-637 Main Cooling Tower)

C-637-2B (North) Cooling Tower - Operational History

- In 1997, the Northeast Plume Containment System became operational.
  - The Record of Decision was signed by DOE and EPA in June 1995.
  - Characterization and construction activities were completed in 1996.
    - Remedial action system consisted of two extraction wells, an equalization tank, a transfer pump, a transfer pipeline and instrumentation and controls.
    - System operation included pumping groundwater contaminated with TCE from two extraction wells to an equalization tank where a transfer pump was used to pump the groundwater from the equalization tank through approximately 6,000 linear feet of transfer line to the C-637 cooling tower. (Note: At C-637-2B groundwater entered the cooling tower via riser #1.)
  - Cooling tower acted as an air stripper to remove TCE from the groundwater.
    - Initially only the C-637-2A cooling tower was used; however, additional piping and valves were installed to also allow the use of the C-637-2B tower if needed.
  - In 2013, an alternate treatment unit was installed to support the NE plume containment system, replacing the use of the C-637 cooling towers.
    - A three-way valve station was installed in the transfer line to allow extracted groundwater to be diverted to either the new alternate treatment unit system or the C-637 cooling towers for air stripping.
    - Piping located at the C-637-2A and C-637-2B cooling towers was air gapped.

- In 2013, C-637-2B was shutdown, along with its associated pump house and blending towers.
  - The basin and influent flume have not been drained and remain full of water; draining has not occurred in order to prevent hydrostatic pressure changes that could cause collapse or floating of the subsurface structure. [Note: The basin has been lowered, filled with makeup water in order to decrease the amount of phosphate remaining in the basin (phosphate value of <1 ppm), and calcium hypochlorite tablets are added once a month to keep the water from becoming septic.]

- C-637-2B transitioned from USEC to DOE in 2014.

C-637-2B – Cooling Tower Northeast Plume Pump and Treat Lines (Air-gapped)

C-637-2B Cooling Tower
Northeast Plume Pump and Treat Line to Riser No. 1

C-637-2B – Cooling Tower Northeast Plume Pump and Treat Terminal Box

C-637-2B Facility Photos: 2/2023

C-637-2B (North) Cooling Tower - Current Status

- Walkdown inspections conducted in February 2023 and March 2023 and employee interviews confirmed no unusual conditions.
  - Both ACM (e.g., transite siding) and lead-based paints are known to be present.
  - Basin located beneath the cooling tower contains sixteen pressure release valves.
  - Houses an influent flume that remains full of water and exits at the bottom of the basin of the cooling tower; southwest corner.
    - Chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the C-637-1 wet well and would be present in the basin.
  - Eleven vaults located within the footprint of the C-637-2B cooling tower; some contain sump pumps.
  - Two external concrete buildings; house the fire sprinkler system.
  - Served as a backup air stripper for the NE Plume Containment System should C-637-2A be off-line; removing TCE from the groundwater (see slide 45).
  - Not used for radiological storage; no radiological postings are present.
  - No GSA or SAA.
  - Historical use of sodium pentachlorophenate; zinc sulphate; arsenic acid; and sodium bichromate for fungicide treatment of wood.
  - Historical chromated water leaks have occurred and were immediately addressed (see slides 42 and 43).
  - No known chemical spills except for chromated water leaks.

C-637-2B– RCW Hot Water Supply to Fire House Heater

C-637-2B - Lateral Flush Line Connection Point

C-637-2B –Corrosion Testing Area

C-637-2B – Structural Damage near Riser No. 4

C-637-2B – Flume Sluice Gates

C-637-2B –Interior and Exterior Structural Damage

C-637-2B Facility Photos: 2/2023

C-637-2B (North) Cooling Tower - Environmental Impacts

- No information to indicate a release or threatened release of a hazardous substance that would require a CERCLA evaluation for a potential response action for demolition of the aboveground structure to protect future public health or welfare or the environment.
  - C-637-2B has exclusively operated as the main cooling tower; cooling heated RCW from the C-337 process building , C-360, and the C-537 switchyard (synchronous condensers) from its construction in 1952/1953 to 2013 and removing TCE from groundwater when C-637-2A was off-line from 1997 to 2013.
  - Building materials used for construction could contain lead-based paints and ACM (e.g., corrugated transite siding).
    - Because the cooling tower was completely rebuilt (wood removed down to basin) in the 1996/1997 timeframe, chemicals used for fungicide treatment prior to 1987 are no longer a concern for the existing wood.
    - In 1992/1993, the RCW system was converted from a chromate system to a phosphate system.
  - Building debris generated from demolition of the aboveground structures can be properly managed using standard demolition and waste management practices.

- Process knowledge and employee interviews indicate that the historical construction and system processes at C-637-2B involved equipment and chemicals that could have the potential to pose a release threat to the basin and associated vaults and underlying soils (including the surrounding area associated with the basin/vaults). (See slide 6 for SWMU 89 details.)
  - Chromated water releases and airborne dispersion of chromium have occurred; making the underlying soils and surrounding area suspect for potential chromium contamination.
  - Historical fungicide treatment of wood; making the underlying soils suspect for potential contamination.
  - Served as a backup air stripper for the NE Plume Containment System; removing TCE from the groundwater.
  - Sixteen pressure release valves are located along the bottom of the basin floor.
  - Basin (currently full of water) is connected to the C-637-1 pump house via an influent flume (currently full of water).
    - Chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the C-637-1 wet well and would be present in the basin (Note: Soda ash was occasionally used on a non-routine basis for pH correction).
  - Eleven vaults located within the footprint of the cooling tower. Historically these types of have been known to contain sump pumps; therefore, it is assumed that there has been drainage to the surrounding soils during past operations.

C-637-2B (North) Cooling Tower - Conclusion and Recommendations

- Walkdown inspection of the facility, employee interviews, and other reviewed historical information did not identify any unusual conditions that would pose a potential threat of environmental release during future demolition of the aboveground structure.
  - Deactivation will include removal of any accessible loose items being stored and certain equipment (e.g., risers, fans, fan motors, and shrouds, etc.) (to the extent practicable) prior to demolition.
  - Any floor drains (along with the vaults, sumps, influent flume, and supply/return lines) will be delineated, documented, and isolated prior to demolition.
  - An evaluation will be made to determine if any measures may be appropriate to stabilize and/or isolate the basin (or portions thereof) from the main floor of the cooling tower prior to demolition. [Note: Measures other than mechanical isolation (one example of a measure other than mechanical isolation would be the addition of flowable fill) will require additional consultation with EPA and Kentucky.]
  - Water from the basin and influent flume will be evaluated for removal and proper disposal as part of deactivation and/or predemolition activities. (Note: Because the basin and influent flume are part of the underlying slab and soils that constitutes the SWMU, a SWMU notification, along with a SAR revision, will be performed documenting removal and disposal of the water associated with deactivation and/or predemolition activities.)

- Pending completion of deactivation and availability of funding, proceeding with demolition and disposal of the C-637-2B facility (aboveground structure) outside of the FFA/CERCLA process, contingent upon the fact that no additional changes have occurred that would affect the CERCLA determination of the facility prior to demolition, is recommended.

- All applicable laws, regulations, and DOE procedures/protocols will be followed to ensure the demolition and disposal of the aboveground structure occurs in a safe, compliant manner, including conducting any additional radiological characterization through confirmation radiological surveys (as necessary) to support demolition and waste disposition.

C-637-2B (North) Cooling Tower - Conclusion and Recommendations

- Based on the construction and historical use at C-637-2B, demolition and disposal of the aboveground structure for C-637-2B is recommended to be conducted outside of the FFA/CERCLA process.

- As part of the demolition of the aboveground structure, the appropriate BMPs will be evaluated and implemented (as needed) to prevent/minimize the pooling and/or migration of storm water that may come into contact with any contamination that may exist on the pad/subsurface structure(s). For example, the following BMPs will be implemented as necessary:
  - Radiological surveying will occur following demolition.
  - Decontamination and/or application of fixatives and/or barriers to contaminated surfaces above regulatory posting limits.
  - Isolation measures and other types of barriers to minimize and/or control runoff/pooling of contaminated storm water [e.g., seal inlets to drains/sumps/subsurface structure(s)].

- Removal of the C-637-2B facility from the Facility D&D OU will be documented in the appropriate annual SMP revision.

- Based on the construction and historical use at C-637-2B, it is recommended that the underlying slab and soils (including surrounding soils within the C-637-2B footprint) undergo further CERCLA evaluation as part of Soils and Slabs OU as currently identified in Appendix 4 of the SMP.
  - The SAR for SWMU 89 will be updated to clarify that the C-637-2B underlying slab and associated soils (including surrounding soils within the C-637-2B footprint) constitutes the SWMU and will undergo a remedial field investigation as part of the Soils and Slabs OU.
  - Consideration will be given to coordinate the timing for issuance and finalization of a revised SAR for SWMU 89 that includes updated information on C-637-2B prior to removal of the aboveground structure.

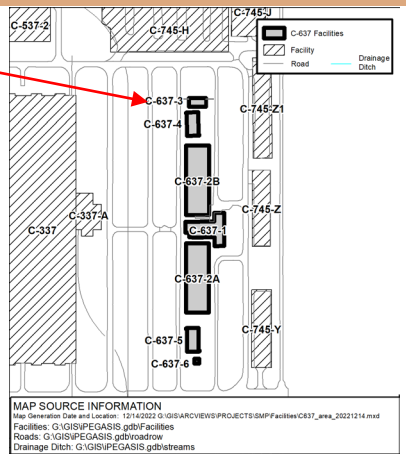
C-637-3 Blending Pump House

C-637-3 Blending Pump House

C-637-3 Blending Pump House - Construction History

- C-637-3 Blending Pump House facility is one of seven facilities located in SWMU 89.
- The facility was constructed in 1975/1976.
- The facility is a one-story steel framed building with a slanted shed roof and exterior corrugated panels on a poured concrete foundation that varies in thickness from ~6 inches to ~4 ft (reinforced under the pumps).
  - Garage-like structure with two pedestrian doorways located on the east and west side of the facility.
  - North side of the facility houses three manually operable louver panels and three high bay removable panels.
  - Houses three blending pumps.
  - Three large water pipes located on the south side of the facility are connected to the C-637-2B cooling tower basin.
- The entire facility is approximately 2,048 ft^2.
  - Measuring ~32 ft x ~64 ft.
    - Six 3-inch floor drains that drain back into the C-637-2B cooling tower basin.

C-637-3 Blending Pump House



C-637-3 – Blending Pump House West Side

C-637-3 – Blending Pump House North Side

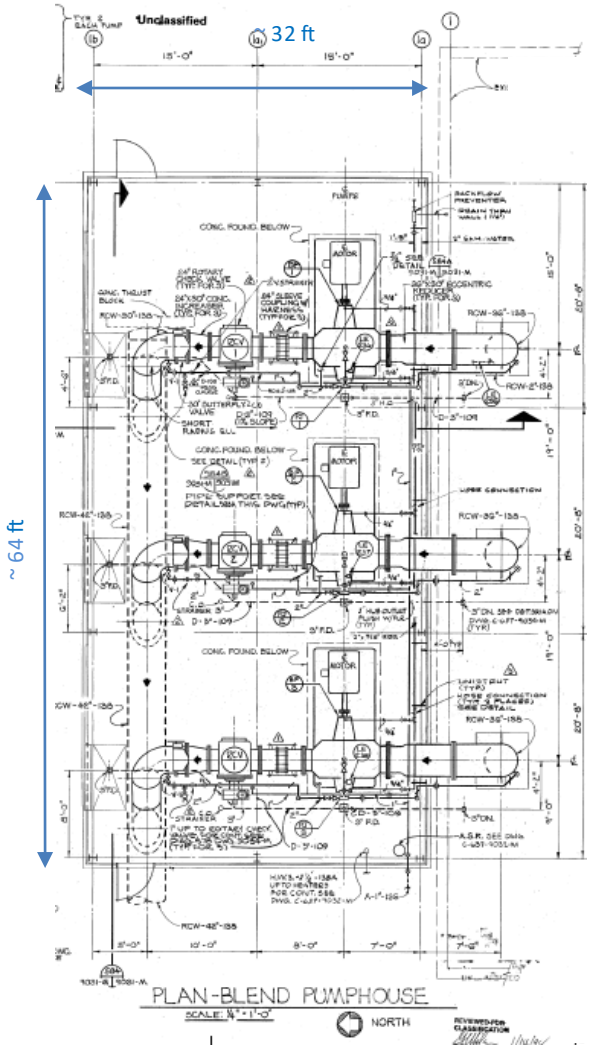
C-637-3 – Blending Pump House South Side

C-637-3 Facility Photos: 2/2023

C-637-3 Blending Pump House - Operational History

- Blending pump houses, along with the blending towers, were constructed as part of the 1970s Cascade Improvement Program and Cascade Uprating Program (CIP/CUP) in anticipation that the increase in enrichment capacity would result in an increase in process temperatures that would require additional cooling capability.
  - Blending pump houses were designed to decrease the temperature of RCW prior to entering into the main cooling tower. (Note: RCW temperatures in excess of 150°F could damage the cooling tower fill material.)
  - Cooled water from the cooling tower basin could be pumped (if needed) through the blending pump house where the cooled water could be "blended" with heated RCW in the return header before the water flowed over the cooling tower for further cooling.

- C-637-3 was originally designed and built as a blending pump house in 1975/1976; however, while brought on-line and tested to ensure proper operation, C-637-3 remained in standby and was never used.
  - The fill material temperature limits were never compromised.



Excerpt of Engineering Drawing from C-637-9031-M, Rev 3; dated 1975

C-637-3 Blending Pump House - Operational History

- USEC leased the facility in the early 1990s and continued to maintain C-637-3 as a blending pump house until enrichment operations ceased at C-337.
  - C-637-3 was routinely inspected and serviced.
  - C-637-3 was retested (late 1980s/early 1990s) to ensure that the system was still in operational order.
- In 2013, C-637-3 was shutdown, along with its associated cooling towers (main cooling towers and blending towers).
- C-637-3 transitioned from USEC to DOE in 2014.
- C-637-3 is no longer operational.

C-637-3 - Pump Discharge Lines

C-637-3 - Skid Frame with Blend Motor and Pump

C-637-3 - Pump Suction Lines Exterior View

C-637-3 - Pump Suction Line Interior View

C-637-3 Facility Photos: 2/2023

C-637-3 Blending Pump House - Current Status

- Walkdown inspection conducted in February 2023 and employee interviews confirmed no unusual conditions.
  - ❑ Houses three blending pumps.
  - ❑ Both ACM (e.g., corrugated transite siding) and lead-based paints are known to be present.
  - ❑ Six 3-inch floor drains are present.
    - All drain back into the C-637-2B cooling tower basin.
  - ❑ Not used for radiological storage; no radiological postings are present.
  - ❑ No GSA or SAA.
  - ❑ Minor oil staining around the blending pumps.
  - ❑ Damage to building insulation (suspect animal infestation).
  - ❑ No known chemical spills.

    Note: Corrosion inhibitors (including chromate) were routinely fed into the RCW system and would have been present if leaks occurred during startup testing and periodic retesting.

C-637-3 - Floor Drain

C-637-3 - Floor Staining

C-637-3 - Fire Sprinkler System

C-637-3 – Damaged Insulation

C-637-3 – Electrical Panels

C-637-3 – Steam Heater

C-637-3 Facility Photos: 2/2023

C-637-3 Blending Pump House - Environmental Impacts

- No information to indicate a release or threatened release of a hazardous substance that would require a CERCLA evaluation for a potential response action for demolition of the aboveground structure to protect future public health or welfare or the environment.
  - C-637-3 was originally designed and built as a blending pump house in 1975/1976 and was tested to ensure proper operations; C-637-3 remained in standby and has never been used from its construction in 1975/1976 to 2013 and was placed into shutdown in 2013.
  - Building materials used for construction could contain lead-based paints and ACM (e.g., corrugated transite siding).
  - Building debris generated from demolition of the aboveground structures can be properly managed using standard demolition and waste management practices.

- Process knowledge and employee interviews indicate that outside of the testing of the operational status at C-637-3, the system remained in standby, was placed into shutdown in 2013, and there is no history or records of chemical spills that would pose an environmental release threat. (See slide 6 for SWMU 89 details.)
  - C-637-3 is located within the footprint of the C-637 Cooling Tower.
  - C-637-3 is connected to part of the RCW system which contained chromated water.
  - Six 3-inch floor drains are located along the slab of the facility that drain back into the C-637-2B cooling tower basin.

C-637-3 Blending Pump House - Conclusion and Recommendations

- Walkdown inspection of the facility, employee interviews, and other reviewed historical information did not identify any unusual conditions that would pose a potential threat of environmental release during future demolition of the aboveground structure.
  - Deactivation will include removal of any accessible loose items being stored and certain equipment (e.g., blend pumps and motors, etc.) (to the extent practicable) prior to demolition.
  - Any floor drains (including the six identified floor drains) will be delineated, documented, and isolated prior to demolition.
- Pending completion of deactivation and availability of funding, proceeding with demolition and disposal of the C-637-3 facility (aboveground structure) outside of the FFA/CERCLA process, contingent upon the fact that no additional changes have occurred that would affect the CERCLA determination of the facility prior to demolition, is recommended.
- All applicable laws, regulations, and DOE procedures/protocols will be followed to ensure the demolition and disposal of the aboveground structure occurs in a safe, compliant manner, including conducting any additional radiological characterization through confirmation radiological surveys (as necessary) to support demolition and waste disposition.

C-637-3 Blending Pump House - Conclusion and Recommendations

- Based on the construction and historical use at C-637-3, demolition and disposal of the aboveground structure for C-637-3 is recommended to be conducted outside of the FFA/CERCLA process.

- As part of the demolition of the aboveground structure, the appropriate BMPs will be evaluated and implemented (as needed) to prevent/minimize the pooling and/or migration of storm water that may come into contact with any contamination that may exist on the pad/subsurface structure(s). For example, the following BMPs will be implemented as necessary:
  - Radiological surveying will occur following demolition.
  - Decontamination and/or application of fixatives and/or barriers to contaminated surfaces above regulatory posting limits.
  - Isolation measures and other types of barriers to minimize and/or control runoff/pooling of contaminated storm water [e.g., seal inlets to drains/sumps/subsurface structure(s)].

- Removal of the C-637-3 facility from the Facility D&D OU will be documented in the appropriate annual SMP revision.

- While there is no history or records of chemical spills that would pose an environmental release threat at C-637-3, based on its construction and association with the C-637 Cooling Tower footprint, it is recommended that the underlying slab and soils undergo further CERCLA evaluation as part of Soils and Slabs OU as currently identified in Appendix 4 of the SMP.
  - The SAR for SWMU 89 will be updated to clarify that the C-637-3 underlying slab and associated soils constitutes the SWMU and will undergo a remedial field investigation as part of the Soils and Slabs OU.
  - Consideration will be given to coordinate the timing for issuance and finalization of a revised SAR for SWMU 89 that includes updated information on C-637-3 prior to removal of the aboveground structure.

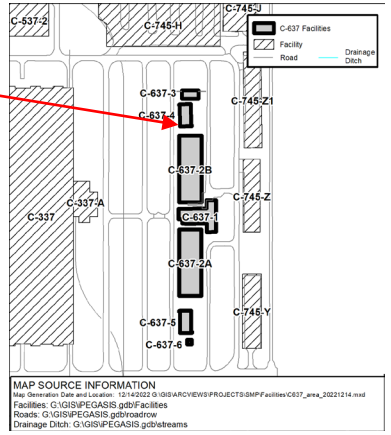
C-637-4 Blending Cooling Tower (North)

C-637-4 Blending Cooling Tower (North)

C-637-4 Blending Cooling Tower (North) - Construction History

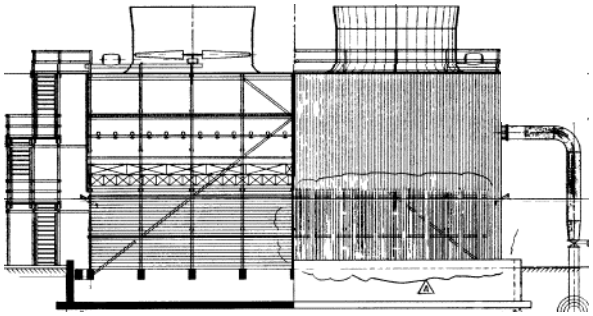
- C-637-4 Blending Cooling Tower (North) facility is one of seven facilities located in SWMU 89.
- The facility was constructed in 1975/1976.
- The facility is a wood frame structure (approximately 35 ft tall) resting on an 8-inch thick poured concrete slab; a deck roof with railing and fan shrouds; and exterior walls of corrugated panels.
  - Often referred to as one of the "CUP towers."
  - Supports two cooling tower cells.
    - Each cell has a fan and driving motor; total of 2 fans/driving motors.
    - Fans are enclosed by protective shrouds.
    - One riser serves each cooling tower cell; total of 2 risers.
    - The tower contains a water distribution system (including lateral flush lines), cold water fill (system of baffles), and mist eliminators.
    - Piping and sprinklers for fire protection throughout.
  - Cools RCW and returns it to the below grade collection basin.
    - Footprint of the basin is larger than the aboveground footprint of the cooling tower; extending approximately 309 ft south of C-637-4.
    - C-637-4 sits on top of a concrete slab with the basin running underneath the slab; as a result, the basin is not open or visible.
    - Approximately 36 – 9-inch diameter holes are drilled into the slab allowing cooled RCW water to fall into the basin below.

C-637-4 Blending Cooling Tower (North)



C-637-4 Blending Cooling Tower – East Side

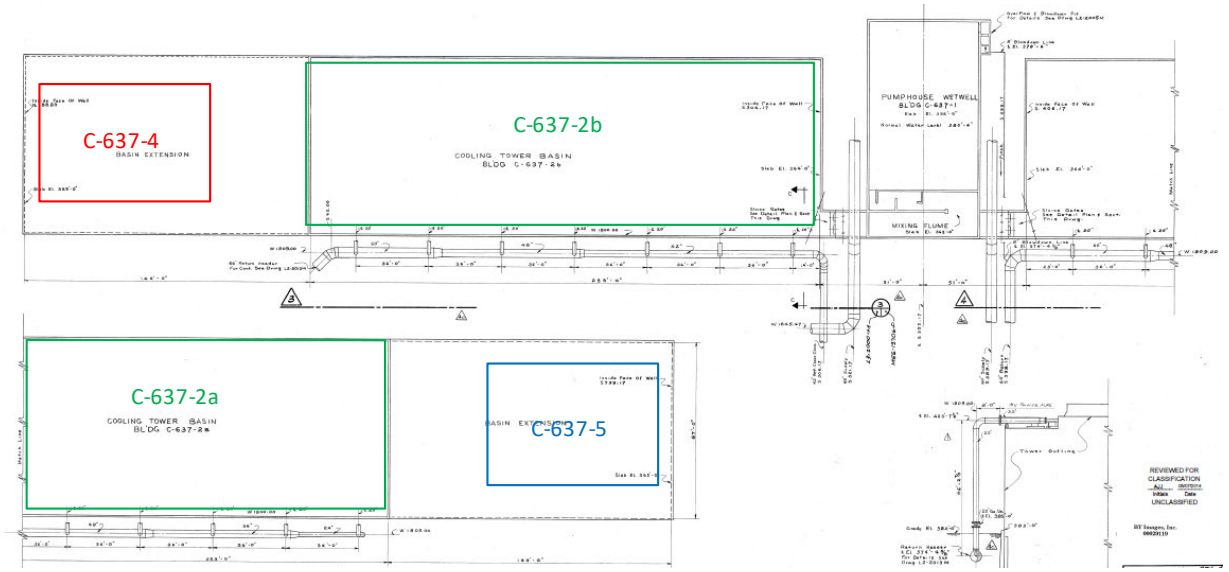
C-637-4 Facility Photo: 2/2023



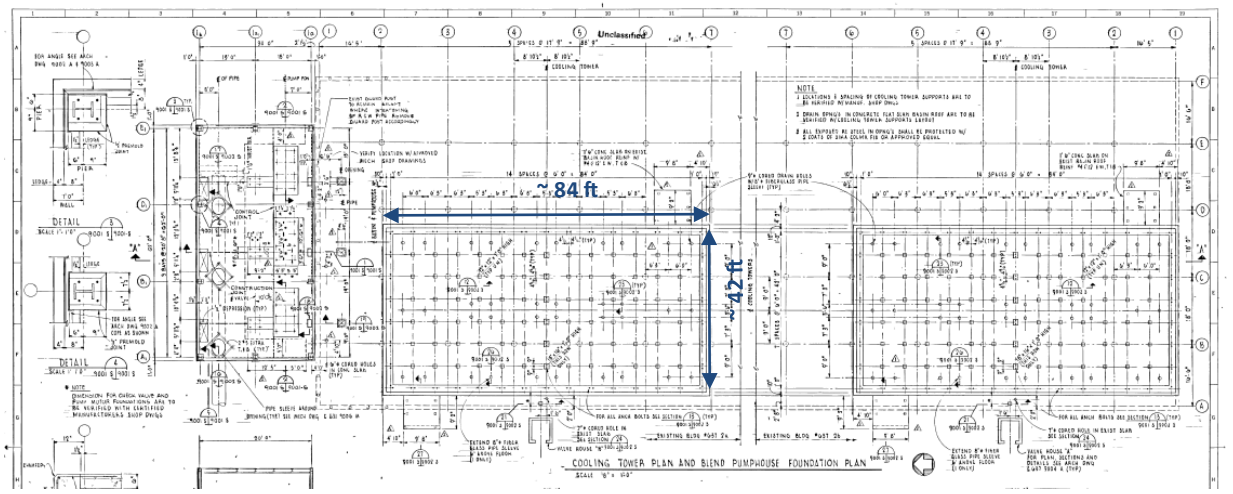
Internal Cooling Tower Components
Excerpt from Engineering Drawing HUC3403-001-01

C-637-4 Blending Cooling Tower (North) - Construction History

- C-637-4 Blending Cooling Tower (North) facility. (Continued)
  - West side infrastructure.
    - One exterior wood staircase; located on the northwest end.
    - Two riser pipes; connect to the below grade piping system.
    - One external concrete building; houses the fire sprinkler system.
  - East side infrastructure.
    - One exterior wood staircase; located on the southeast end.
    - Electrical power supply to fans.
    - Flush line connection points.
  - Roof infrastructure.
    - Wood decking with railing that extends the circumference of the tower.
    - Support fans that are enclosed with protective shrouds.



Excerpt of Engineering Drawing of C-637-2A&B Layout; L3-2000M, dated 1952

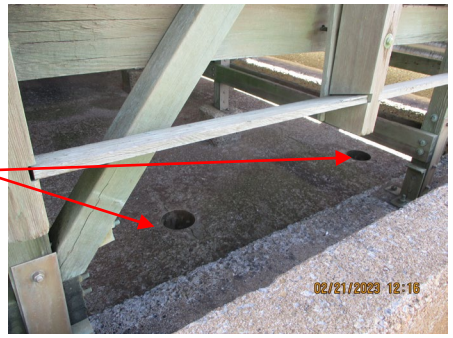


Excerpt of Engineering Drawing of C-637 Blending Towers and Blending Tower Pump House Foundation Plan; C-637-9001-S, dated 1974

C-637-4 Blending Cooling Tower (North) - Construction History

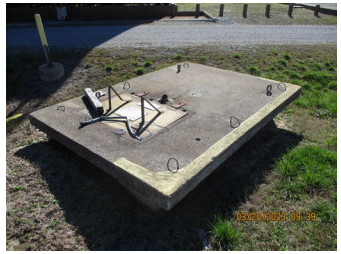
- C-637-4 facility (aboveground structure) is approximately 3,528 ft^2; measuring ~ 42 ft x ~ 84 ft.
  - Collection basin (underground) measuring ~87 ft x ~393 ft x ~15 ft.
    - This basin is the larger basin footprint that runs underneath the C-637-2B Cooling Tower. (Note: The portion of the basin under the C-637-2B cooling tower contains the influent flume that connects the C-637-2B cooling tower basin to the C-637-1 pump house.)
  - One external concrete building measuring ~6 ft 8 inches x ~6 ft 8 inches x ~9 ft.
    - Houses the fire sprinkler system.
    - Located within footprint of the blending cooling tower.
  - Two vaults support C-637-4.
    - While installed and associated with the C-637-4 blending tower, these vaults are located within footprint of the C-637-2B main cooling tower.
      - G-Loop Return Blending Tower Crossover vault.
      - G-Loop Return to Blending Tower vault.

9-inch Diameter Holes to Basin (Allows cooled RCW water to fall into the basin below)



C-637-4 Top of Basin Slab

C-637-4 Fire Sprinkler System



G-Loop Return Blending Tower Crossover Vault

G-Loop Return to Blending Tower Vault

C-637-4 Facility Photos: 2/2023 and 3/2023

C-637-4 Blending Cooling Tower (North) - Operational History

- Blending cooling towers, along with blending pump houses, were constructed as part of the 1970s CIP/CUP in anticipation that the increase in enrichment capacity would result in an increase in process temperatures that would require additional cooling capacity.
  - Blending cooling towers were designed similar to the main cooling tower and provided additional cooling capacity.

- C-637-4 was originally built and operated as a blending cooling tower from its construction in 1975/1976 to 2013.
  - Often referred to as one of the "CUP cooling towers."
  - Heated RCW from the C-337 process building, C-360, and the C-537 switchyard (synchronous condensers) was distributed through various sections of the blending cooling tower and released via evaporation; cooled RCW was then collected into the cooling tower basin where it then flowed by gravity via an influent flume and into a mixing flume and wet well located underneath the C-637-1 pump house.

C-637-4 Blending Cooling Tower – East Side

C-637-4 Blending Cooling Tower – West Side

C-637-4 Facility Photos: 2/2023

C-637-4 Blending Cooling Tower (North) - Operational History

- Brown rot fungi growth was a problem for the blending cooling towers even though they were constructed with treated redwood.
  - All cell plenum chambers, tower deck, outer sidewalls, and tower tops were treated periodically with one of two types of fungicide solutions:
    - Sodium pentachlorophenate.
    - Double diffusion method – first spraying with a solution of zinc sulphate and arsenic acid followed by a second spraying with a solution of sodium bichromate.
  - Fungicide treatment was discontinued in 1987.

C-637-4 Southeast Corner – Lateral and Flush Lines

- In 1979, a cooling tower drift study was conducted to determine the impact of chromium disposition from the cooling towers.
  - Vegetation survey provided evidence of long-term transport and disposition of chromium to terrestrial ecosystem components.
    - Decrease in concentration with distance; most disposition is confined to DOE property.
  - Chromium deposited by drift to soils or lost to soils from vegetation does not accumulate significantly beyond 200 meters from the towers.
    - Soil chromium is the less soluble and less biologically active oxidation state (Cr^{+3}).

C-637-4 Northwest Corner – Stairs and Riser No. 9

C-637-4 Facility Photos: 2/2023

C-637-4 Blending Cooling Tower (North) - Operational History

- In 1981, RCW sprinkler alarms were installed.
- USEC leased the facility in the early 1990s and continued to use C-637-4 as a blending cooling tower until enrichment operations ceased at C-337.
- In 2001, a violent thunderstorm resulted in the loss of siding.
- From 2008-2010 the CUP cooling towers underwent refurbishment.
  - Refurbishment included the replacement of selected structure and decking materials. (Note: Mechanical repairs to motors, gear boxes, etc., also occurred over the years of operation.)
- In 2010, a leak was discovered in the #9 riser between ground level and the isolation valve of the riser.
  - No water was released to KPDES outfall; leak was repaired.
- In 2013, C-637-4 was shutdown, along with its associated pump house.
  - The basin and influent flume have not been drained and remain full of water; draining has not occurred in order to prevent hydrostatic pressure changes that could cause collapse or floating of the subsurface structure.
- C-637-4 transitioned from USEC to DOE in 2014.

C-637-4 Southeast Corner Stairs

C-637-4 – East Side- Basin Roof

C-637-4 – North Side

C-637-4 – South Side

C-637-4 Facility Photos: 2/2023

C-637-4 Blending Cooling Tower (North) - Current Status

- Walkdown inspection conducted in February 2023 and employee interviews confirmed no unusual conditions.
  - Both ACM (e.g., transite siding) and lead-based paints are known to be present.
  - Historical use of sodium pentachlorophenate; zinc sulphate; arsenic acid; and sodium bichromate for fungicide treatment of wood.
  - One external concrete building; houses the fire sprinkler system.
  - Not used for radiological storage; no radiological postings present.
  - No GSA or SAA.
  - Basin located beneath the C-637-4 blending cooling tower is associated with the C-637-2B cooling tower basin (basin remains full of water).
    - Contains sixteen pressure release valves.
    - Houses an influent flume that exits at the bottom of the basin of the cooling tower (influent flume remains full of water).
    - Chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the C-637-1 wet well and would be present in the basin.
    - Historical chromated water leaks have occurred.
  - No known chemical spills except for those associated with the basin (e.g., chromated water leaks).
  - Two vaults associated with C-637-4 (G-Loop Return) are located within the footprint of the main cooling tower.

C-637-4 – West Side Roof Basin

C-637-4 – Structural Frame

C-637-4 – Flush Line (Air-gapped)

C-637-4 Facility Photos: 2/2023

C-637-4 Blending Cooling Tower (North) - Environmental Impacts

- No information to indicate a release or threatened release of a hazardous substance that would require a CERCLA evaluation for a potential response action for demolition of the aboveground structure to protect future public health or welfare or the environment.
  - C-637-4 was exclusively operated as a blending cooling tower; cooling heated RCW from the C-337 process building, C-360, and the C-537 switchyard (synchronous condensers) from its construction in 1975/1976 to 2013.
  - Building materials used for construction could contain lead-based paints and ACM (e.g., corrugated transite siding).
    - Because the C-637-4 blending cooling tower was not completely refurbished; chemicals used for fungicide treatment in 1987 may still be of concern.
    - In 1992/1993, the RCW system was converted from a chromate system to a phosphate system.
  - Building debris generated from demolition of the aboveground structures can be properly managed using standard demolition and waste management practices.

- Process knowledge and employee interviews indicate that the historical construction and system processes at C-637-4 involved equipment and chemicals that could have the potential to pose a release threat to the basin and underlying soils (including the surrounding area associated with the basin/vaults). (See slide 6 for SWMU 89 details.)
  - Chromated water releases and airborne dispersion of chromium have occurred; making the underlying soils and surrounding area suspect for potential chromium contamination.
  - Historical fungicide treatment of wood; making the underlying soils suspect for potential contamination.
  - Sixteen pressure release valves are located along the bottom of the basin floor.
  - Basin (currently full of water) is connected to the C-637-1 pump house via an influent flume (currently full of water).
    - Chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the C-637-1 wet well and would be present in the basin.
  - Two of the eleven vaults located within the footprint of the C-637-2B main cooling tower are associated with C-637-4. Historically these types of vaults have been known to contain sump pumps; therefore, it is assumed that there has been drainage to the surrounding soils during past operations.

C-637-4 Blending Cooling Tower (North) - Conclusion and Recommendations

- Walkdown inspection of the facility, employee interviews, and other reviewed historical information did not identify any unusual conditions that would pose a potential threat of environmental release during future demolition of the aboveground structure.
  - Deactivation will include removal of any accessible loose items being stored and certain equipment (e.g., risers, fans, fan motors, and shrouds, etc.) (to the extent practicable) prior to demolition.
  - Any floor drains will be delineated, documented, and isolated prior to demolition.
  - An evaluation will be made to determine if any measures may be appropriate to stabilize and/or isolate the basin (or portions thereof) from the main floor of the cooling tower prior to demolition. [Note: Measures other than mechanical isolation (one example of a measure other than mechanical isolation would be the addition of flowable fill) will require additional consultation with EPA and Kentucky.]
  - Water from the basin and influent flume will be evaluated for removal and proper disposal as part of deactivation and/or predemolition activities. (Note: Because the basin and influent flume are part of the underlying slab and soils that constitutes the SWMU, a SWMU notification, along with a SAR revision, will be performed documenting removal and disposal of the water associated with deactivation and/or predemolition activities.)

- Pending completion of deactivation and availability of funding, proceeding with demolition and disposal of the C-637-4 facility (aboveground structure) outside of the FFA/CERCLA process, contingent upon the fact that no additional changes have occurred that would affect the CERCLA determination of the facility prior to demolition, is recommended.

- All applicable laws, regulations, and DOE procedures/protocols will be followed to ensure the demolition and disposal of the aboveground structure occurs in a safe, compliant manner, including conducting any additional radiological characterization through confirmation radiological surveys (as necessary) to support demolition and waste disposition.

C-637-4 Blending Cooling Tower (North) - Conclusion and Recommendations

- Based on the construction and historical use at C-637-4, demolition and disposal of the aboveground structure for C-637-4 is recommended to be conducted outside of the FFA/CERCLA process.

- As part of the demolition of the aboveground structure, the appropriate BMPs will be evaluated and implemented (as needed) to prevent/minimize the pooling and/or migration of storm water that may come into contact with any contamination that may exist on the pad/subsurface structure(s). For example, the following BMPs will be implemented as necessary:
  - Radiological surveying will occur following demolition.
  - Decontamination and/or application of fixatives and/or barriers to contaminated surfaces above regulatory posting limits.
  - Isolation measures and other types of barriers to minimize and/or control runoff/pooling of contaminated storm water [e.g., seal inlets to drains/sumps/subsurface structure(s)].

- Removal of the C-637-4 facility from the Facility D&D OU will be documented in the appropriate annual SMP revision.

- Based on the construction and historical use at C-637-4, it is recommended that the underlying slab and soils (including surrounding soils within the C-637-4 footprint) undergo further CERCLA evaluation as part of Soils and Slabs OU as currently identified in Appendix 4 of the SMP.
  - The SAR for SWMU 89 will be updated to clarify that the C-637-4 underlying slab and associated soils (including surrounding soils within the C-637-4 footprint) constitutes the SWMU will undergo a remedial field investigation as part of the Soils and Slabs OU.
  - Consideration will be given to coordinate the timing for issuance and finalization of a revised SAR for SWMU 89 that includes updated information on C-637-4 prior to removal of the aboveground structure.

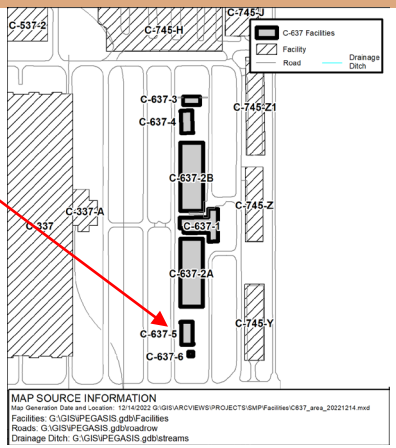
C-637-5 Blending Cooling Tower (South)

C-637-5 Blending Cooling Tower (South)

C-637-5 Blending Cooling Tower (South) - Construction History

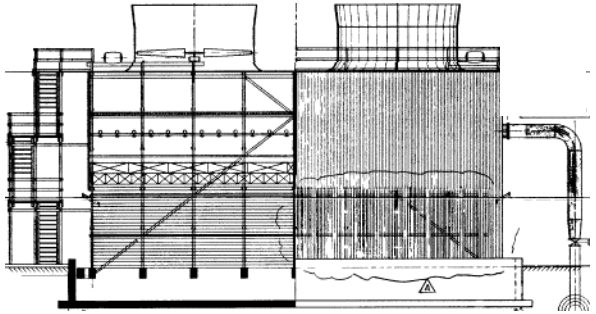
- C-637-5 Blending Cooling Tower (South) facility is one of seven facilities located in SWMU 89.
- The facility was constructed in 1975/1976.
- The facility is a wood frame structure (approximately 32 ft tall) resting on an 8-inch thick poured concrete slab; a deck roof with railing and fan shrouds; and exterior walls of corrugated panels.
  - Often referred to as one of the "CUP towers."
  - Supports two cooling tower cells.
    - Each cell has a fan and driving motor; total of 2 fans/driving motors.
    - Fans are enclosed by protective shrouds.
    - One riser serves each cooling tower cell; total of 2 risers.
    - The tower contains a water distribution system (including lateral flush lines), cold water fill (system of baffles), and mist eliminators.
    - Piping and sprinklers for fire protection throughout.
  - Cools RCW and returns it to the below grade collection basin.
    - Footprint of the basin is larger than the aboveground footprint of the blending cooling tower; extending approximately 309 ft north of C-637-5.
    - C-637-5 sits on top of a concrete slab with the basin running underneath the slab; as a result, the basin is not open or visible.
    - Approximately 36– 9-inch diameter holes are drilled into the slab allowing cooled RCW water to fall into the basin below.

C-637-5 Blending Cooling Tower (South)



C-637-5 Blending Cooling Tower – West Side

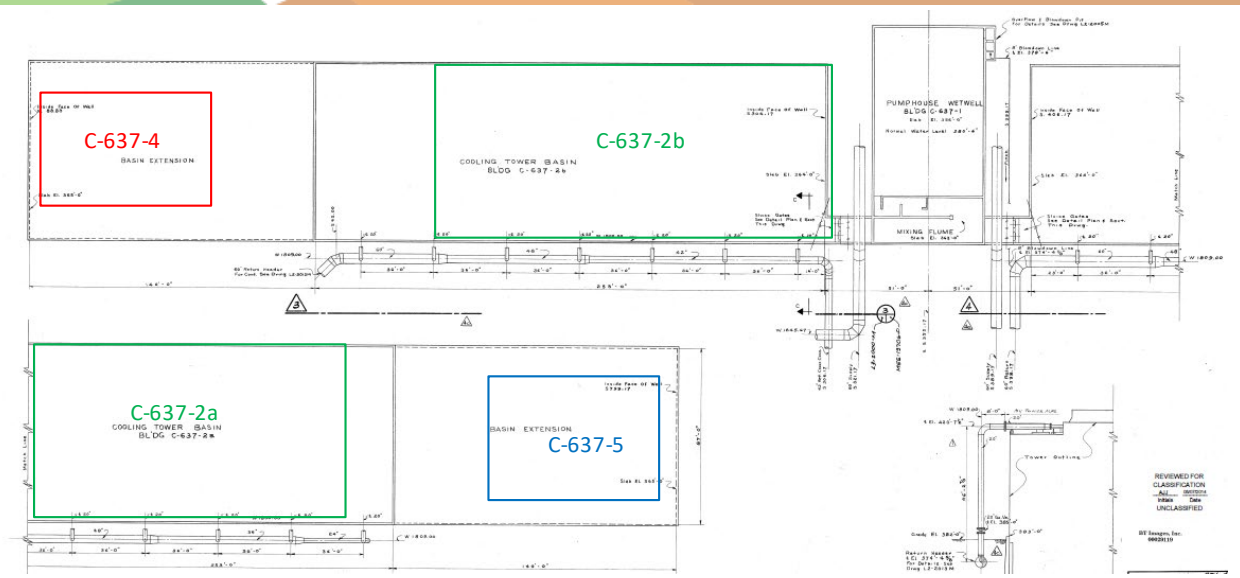
C-637-5 Facility Photo: 2/2023



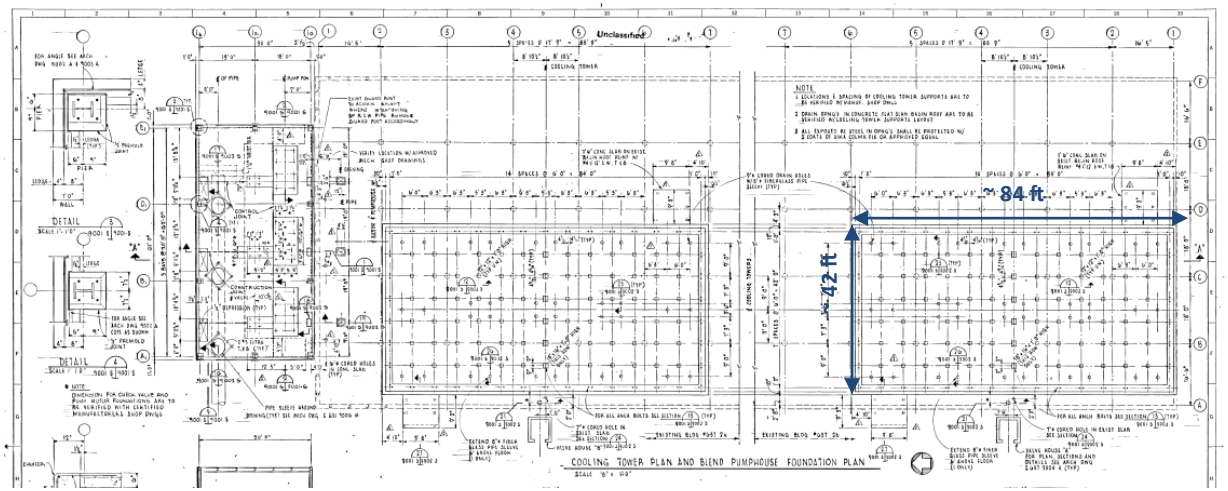
Internal Cooling Tower Components Excerpt from Engineering Drawing HUC3403-001-01

C-637-5 Blending Cooling Tower (South) - Construction History

- The facility is a wood frame structure… (Continued)
  - West side infrastructure.
    - One exterior wood staircase; located on the northwest end.
    - Three riser pipes; connect to the below grade piping system.
    - One external concrete building; houses the fire sprinkler system.
  - East side infrastructure.
    - One exterior wood staircase; located on the southeast end.
    - Electrical power supply to fans.
    - Flush line connection points.
  - Roof infrastructure.
    - Wood decking with railing that extends the circumference of the tower.
    - Support fans that are enclosed with protective shrouds.



Excerpt of Engineering Drawing of C-637-2A&B Layout; L3-2000M, dated 1952



Excerpt of Engineering Drawing of C-637 Blending Towers and Blending Tower Pump House Foundation Plan; C-637-9001-S, dated 1974

C-637-5 Blending Cooling Tower (South) - Operational History

- Blending cooling towers, along with blending pump houses, were constructed as part of the 1970s CIP/CUP in anticipation that the increase in enrichment capacity would result in an increase in process temperatures that would require additional cooling capability.
  - Blending cooling towers were designed similar to the main cooling tower and provided additional cooling capacity.

- C-637-5 was originally built and operated as a blending cooling tower from its construction in 1975/1976 to 2013.
  - Often referred to as one of the "CUP cooling towers."
  - Heated RCW from the C-337 process building, C-360, and the C-537 switchyard (synchronous condensers) was distributed through various sections of the blending cooling tower and released via evaporation; cooled RCW was then collected into the cooling tower basin where it then flowed by gravity via an influent flume and into the mixing flume and wet well located underneath the C-637-1 pump house.

C-637-5 Blending Cooling Tower – North Side

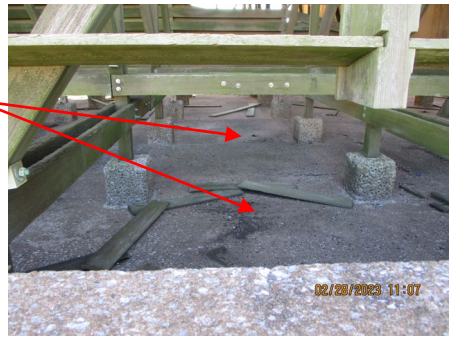
C-637-5 Blending Cooling Tower - South Side

C-637-5 Facility Photos: 2/2023

C-637-5 Blending Cooling Tower (South) - Construction History

- C-637-5 facility (aboveground structure) is approximately 3,528 ft^2; measuring ~42 ft x ~84 ft.
  - Collection basin measuring ~87 ft x ~393 ft x ~15 ft.
    - This basin is the larger basin footprint that runs underneath the C-637-2A Cooling Tower. (Note: The portion of the basin under the C-637-2A cooling tower contains the influent flume that connects the C-637-2A cooling tower basin to the C-637-1 pump house.)
  - One external concrete building measuring ~6 ft 8 inches x ~6 ft 8 inches x ~9 ft.
    - Houses the fire sprinkler system.
    - Located within footprint of the blending cooling tower.
  - Three vaults support C-637-5.
    - While installed and associated with the C-637-5 blending tower, these vaults are located within footprint of the C-637-2A main cooling tower.
      - H-Loop Return Blending Tower Crossover vault.
      - H-Loop Return to Blending Tower vault.
      - H-Loop Return Bypass to Blending Tower vault.

9-inch Diameter Holes to Basin (Allows cooled RCW water to fall into the basin below)



C-637-5 - Top of Basin Slab

C-637-5 - Fire Sprinkler System

H-Loop Return to Blending Tower Crossover Vault

H-Loop Return to Blending Tower Vault

H-Loop Return Bypass to Blending Tower Vault

C-637-5 Facility Photos: 2/2023 and 3/2023

C-637-5 Blending Cooling Tower (South) - Operational History

- Brown rot fungi growth was a problem for the blending cooling towers even though they were constructed with treated redwood.
  - All cell plenum chambers, tower deck, outer sidewalls, and tower tops were treated periodically with one of two types of fungicide solutions:
    - Sodium pentachlorophenate.
    - Double diffusion method – first spraying with a solution of zinc sulphate and arsenic acid followed by a second spraying with a solution of sodium bichromate.
  - Fungicide treatment was discontinued in 1987.

- In 1979, a cooling tower drift study was conducted to determine the impact of chromium dispersion from the cooling towers.
  - Vegetation survey provided evidence of long-term transport and disposition of chromium to terrestrial ecosystem components.
    - Decrease in concentration with distance; most disposition is confined to DOE property.
  - Chromium deposited by drift to soils or lost to soils from vegetation does not accumulate significantly beyond 200 meters from the towers
    - Soil chromium is the less soluble and less biologically active oxidation state (Cr^{+3}).

C-637-5 – East Side

C-637-5 – West Side

C-637-5 Facility Photos: 2/2023

C-637-5 Blending Cooling Tower (South) - Operational History

- In 1981, RCW sprinkler alarms were installed.
- USEC leased the facility in the early 1990s and continued to use C-637-5 as a blending cooling tower until enrichment operations ceased at C-337.
- In 2003, approximately 1,080 ft^2 of transite siding was blown off the cooling tower during a high wind event.
- From 2008-2010 the CUP cooling towers underwent refurbishment.
  - Refurbishment included the replacement of selected structure and decking materials. (Note: Mechanical repairs to motors, gear boxes, etc., also occurred over the years of operation.)
- In 2013, C-637-5 was shutdown, along with its associated pump house.
  - The basin and influent flume have not been drained and remain full of water; draining has not occurred in order to prevent hydrostatic pressure changes that could cause collapse or floating of the subsurface structure.
- C-637-5 transitioned from USEC to DOE in 2014.

C-637-5 – West Side Stairs and No. 8 Riser

C-637-5 – West Side Roof Basin

C-637-5 Facility Photos: 2/2023

C-637-5 Blending Cooling Tower (South) - Current Status

- Walkdown inspection conducted in February 2023 and employee interviews confirmed no unusual conditions.
  - Both ACM (e.g., transite siding) and lead-based paints are known to be present.
  - Historical use of sodium pentachlorophenate; zinc sulphate; arsenic acid; and sodium bichromate for fungicide treatment of wood.
  - One external concrete building; houses the fire sprinkler system.
  - Not used for radiological storage; no radiological postings present.
  - No GSA or SAA.
  - Basin located beneath the C-637-5 blending cooling tower is associated with the C-637-2A cooling tower basin (basin remains full of water).
    - Contains sixteen pressure release valves.
    - Houses an influent flume that exits at the bottom of the basin of the cooling tower (influent flume remains full of water).
    - Chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the C-637-1 wet well and would be present in the basin.
    - Historical chromated water leaks have occurred.
  - No known chemical spills except for those associated with the basin (e.g., chromated water leaks).
  - Three vaults associated with C-637-5 (H-Loop Return) are located within the footprint of the main cooling tower.

C-637-5 – Structural Frame (West Side)

C-637-5 – Flush Line Connection Point

C-637-5 – Basin Roof (East Side)

C-637-5 – Sprinkler

C-637-5 Facility Photos: 2/2023

C-637-5 Blending Cooling Tower (South) - Environmental Impacts

- No information to indicate a release or threatened release of a hazardous substance that would require a CERCLA evaluation for a potential response action for demolition of the aboveground structure to protect future public health or welfare or the environment.
  - C-637-5 was exclusively operated as a blending cooling tower; cooling heated RCW from the C-337 process building, C-360, and the C-537 switchyard (synchronous condensers) from its construction in 1975/1976 to 2013.
  - Building materials used for construction could contain lead-based paints and ACM (e.g., corrugated transite siding).
    - Because the C-637-5 blending cooling tower was not completely refurbished; chemicals used for fungicide treatment through 1987 may be of concern.
    - In 1992/1993, the RCW system was converted from a chromate system to a phosphate system.
  - Building debris generated from demolition of the aboveground structures can be properly managed using standard demolition and waste management practices.

- Process knowledge and employee interviews indicate that the historical construction and system processes at C-637-5 involved equipment and chemicals that could have the potential to pose a release threat to the basin and underlying soils (including the surrounding area associated with the basin/vaults). (See slide 6 for SWMU 89 details.)
  - Chromated water releases and airborne dispersion of chromium have occurred; making the underlying soils and surrounding area suspect for potential chromium contamination.
  - Historical fungicide treatment of wood; making the underlying soils suspect for potential contamination.
  - Sixteen pressure release valves are located along the bottom of the basin floor.
  - Basin (currently full of water) is connected to the C-637-1 pump house via an influent flume (currently full of water).
    - Chlorine, sulfuric acid, and corrosion inhibitors (including chromate) were routinely fed into the RCW system via the C-637-1 wet well and would be present in the basin.
  - Three of the eleven vaults located within the footprint of the C-637-2A main cooling tower are associated with C-637-5. Historically these types of vaults have been known to contain sump pumps; therefore, it is assumed that there has been drainage to the surrounding soils during past operations.

C-637-5 Blending Cooling Tower (South) - Conclusion and Recommendations

- Walkdown inspection of the facility, employee interviews, and other reviewed historical information did not identify any unusual conditions that would pose a potential threat of environmental release during future demolition of the aboveground structure.
  - Deactivation will include removal of any accessible loose items being stored and certain equipment (e.g., risers, fans, fan motors, and shrouds, etc.) (to the extent practicable) prior to demolition.
  - Any floor drains will be delineated, documented, and isolated prior to demolition.
  - An evaluation will be made to determine if any measures may be appropriate to stabilize and/or isolate the basin (or portions thereof) from the main floor of the cooling tower prior to demolition. [Note: Measures other than mechanical isolation (one example of a measure other than mechanical isolation would be the addition of flowable fill) will require additional consultation with EPA and Kentucky.]
  - Water from the basin and influent flume will be evaluated for removal and proper disposal as part of deactivation and/or predemolition activities. (Note: Because the basin and influent flume are part of the underlying slab and soils that constitutes the SWMU, a SWMU notification, along with a SAR revision, will be performed documenting removal and disposal of the water associated with deactivation and/or predemolition activities.)

- Pending completion of deactivation and availability of funding, proceeding with demolition and disposal of the C-637-5 facility (aboveground structure) outside of the FFA/CERCLA process, contingent upon the fact that no additional changes have occurred that would affect the CERCLA determination of the facility prior to demolition, is recommended.

- All applicable laws, regulations, and DOE procedures/protocols will be followed to ensure the demolition and disposal of the aboveground structure occurs in a safe, compliant manner, including conducting any additional radiological characterization through confirmation radiological surveys (as necessary) to support demolition and waste disposition.

C-637-5 Blending Cooling Tower (South) - Conclusion and Recommendations

- Based on the construction and historical use at C-637-5, demolition and disposal of the aboveground structure for C-637-5 is recommended to be conducted outside of the FFA/CERCLA process.

- As part of the demolition of the aboveground structure, the appropriate BMPs will be evaluated and implemented (as needed) to prevent/minimize the pooling and/or migration of storm water that may come into contact with any contamination that may exist on the pad/subsurface structure(s). For example, the following BMPs will be implemented as necessary:
  - Radiological surveying will occur following demolition.
  - Decontamination and/or application of fixatives and/or barriers to contaminated surfaces above regulatory posting limits.
  - Isolation measures and other types of barriers to minimize and/or control runoff/pooling of contaminated storm water [e.g., seal inlets to drains/sumps/subsurface structure(s)].

- Removal of the C-637-5 facility from the Facility D&D OU will be documented in the appropriate annual SMP revision.

- Based on the construction and historical use at C-637-5, it is recommended that the underlying slab and soils (including surrounding soils within the C-637-5 footprint) undergo further CERCLA evaluation as part of Soils and Slabs OU as currently identified in Appendix 4 of the SMP.
  - The SAR for SWMU 89 will be updated to clarify that the C-637-5 underlying slab and associated soils (including surrounding soils within the C-637-5 footprint) constitutes the SWMU and will undergo a remedial field investigation as part of the Soils and Slabs OU.
  - Consideration will be given to coordinate the timing for issuance and finalization of a revised SAR for SWMU 89 that includes updated information on C-637-5 prior to removal of the aboveground structure.

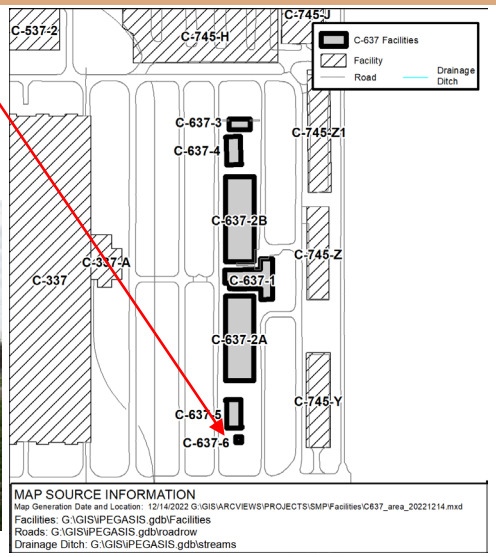
C-637-6 Sand Filter Building

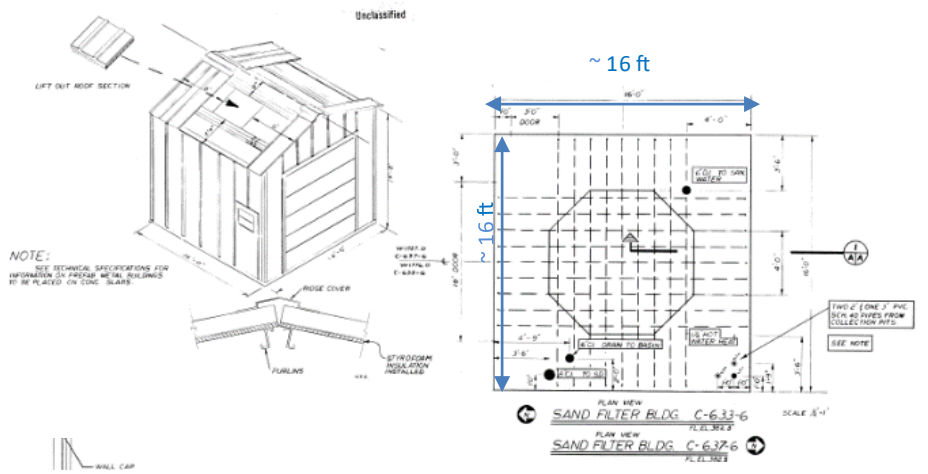
C-637-6 Sand Filter Building

C-637-6 Sand Filter Building - Construction History

- C-637-6 Sand Filter building is one of seven facilities located in SWMU 89.
- The facility was constructed in 1981.
- The facility is a single-story, prefabricated metal building on a 6-inch poured concrete slab.
  - Gable roof with a 4 ft removable roof insert.
  - West side pedestrian door; south side garage bay roll-up door.
  - Houses a Permutit® sand filter tank, fabri-basket filter system, and system piping.
    - Permutit® sand filter tank (measuring ~ 8' dia. X ~ 11'6") is located on a 6-inch hexagon shaped concrete platform that sits on the 6-inch concrete building slab (sits on a total 12 inches of concrete).
    - Fabri-basket filter system is a wall-mounted system located on the east wall.
- The entire facility is approximately 256 ft^2 measuring ~16 ft x ~16 ft x ~14 ft.
  - Three pipe enclosed drains are present.
    - Two drain back to the C-637-2A basin: filtered water and RCW.
    - One drains into the storm sewer; backwash water.

C-637-6 – Sand Filter Building South Side





Floor Plan View: Excerpt from Engineering Drawing S5E 15015-A Rev 0, dated 1980

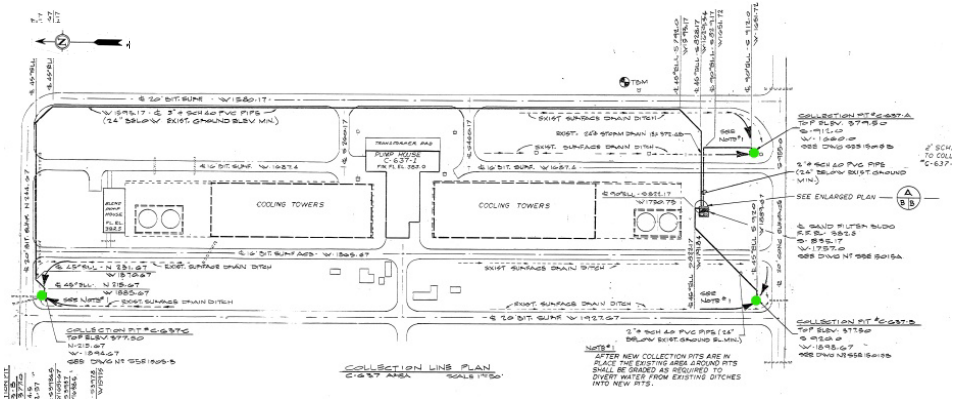
C-637-6 Facility Photo: 3/2023

C-637-6 Sand Filter Building - Construction History

- C-637-6 was originally designed and operated as a sand filter building; supporting the filtering of water [wind carried mist (e.g., windage) and surface water runoff] surrounding the cooling towers prior to returning it back to the C-637 cooling tower basin.
  - Three concrete collection basins (C-637-A, C-637-B, and C-637-C) with sump pumps located on the north and south ends of the cooling tower footprint collected and piped water to C-637-6.
  - C-637-6 is heated with hot RCW that is supplied from the process building to fin tube heaters located along the facility walls.
  - Sanitary water is supplied to the facility and used to backwash the Permutit® sand filter tank.

- USEC leased the facility in the early 1990s and continued to use C-637-6 as a sand filter building.

- In 1991, a sump pump in the cooling tower drift collection system was discovered to be inoperable.
  - The sump filled and overflowed to the storm drain going to KPDES Outfall 002.
  - Cr^{+6} measured 0.11 mg/L; did not exceed the discharge limit of 0.31 mg/L.
  - A portable pump was used to pump water back to the C-637-2A basin until the pump was repaired.



Excerpt from Engineering Drawing C5E 15015-B, dated 1980

C-637-A – Collection Basin

C-637-B – Collection Basin

C-637-C – Collection Basin

C-637-6 Facility Photos: 3/2023

C-637-6 Sand Filter Building - Construction History

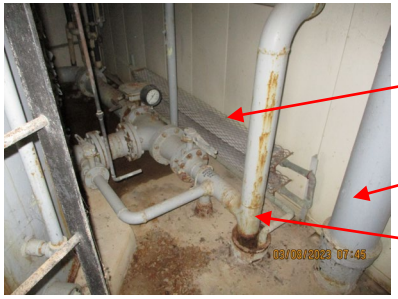
- In 2011, it was determined that the sand filter tank had a slow leak.
  - The sand filter bypass was opened to alleviate pressure on the tank; bypass sent water directly to the C-637-2A basin.
- In 2013, C-637-6 was shutdown, along with its associated cooling towers (main cooling tower and blending towers).
- C-637-6 transitioned from USEC to DOE in 2014.
- In 2014, it was discovered that the valve to the sanitary water line had frozen and burst resulting in a large sanitary water leak.
  - Valve was repaired.
- In 2016, C-637-6 was no longer in service and electricity and water were isolated.
  - Permutit® sand filter tank was drained.
  - Sanitary water line was capped at both the incoming line and floor locations.

C-637-6 – Fabri-Basket Filter System

C-637-6 – Permutit® Sand Filter Tank

C-637-6 – Inlets from Windage Collection Sumps

C-637-6 – Flow Orifice and Discharge Piping



C-637-6 – Drain Lines to Storm Sewer and C-637-2A Basin

C-637-6 Facility Photos: 3/2023

C-637-6 Sand Filter Building - Current Status

- Walkdown inspection conducted in March 2023 and employee interviews confirmed no unusual conditions.
  - Houses a Permutit® sand filter tank; drained and air-gapped.
  - Houses a wall mounted fabri-basket filter system.
  - No known ACM.
  - Lead-based paints are suspected to be present.
  - Three pipe enclosed drains are present.
    - One drain for filtered water; drains back into the C-637-2A basin.
    - One drain for RCW water; drains back into the C-637-2A basin.
    - One drain for backwash water; drains into the storm sewer.
  - Not used for radiological storage; no radiological postings are present.
  - No GSA or SAA.
  - Visible signs of historical water leaks and Permutit® sand filter tank corrosion.
  - Contains some loose piping and wiring.
  - No known chemical spills.

C-637-6 - Permutit® Sand Filter Tank Drain

C-637-6 - Permutit® Sand Filter Tank (Corrosion Damage)

C-637-6 -Permutit® Sand Filter Tank (Pressure Differential Indicator)

C-637-6 – Piping System (East Wall)

C-637-6 – Sand Filter

C-637-6 -Sanitary Water Line (Capped)

C-637-6 Facility Photos: 3/2023

C-637-6 Sand Filter Building – Environmental Impacts

- No information to indicate a release or threatened release of a hazardous substance that would require a CERCLA evaluation for a potential response action for demolition of the structure (aboveground and subgrade) to protect future public health or welfare or the environment.

- C-637-6 has exclusively operated as a sand filter building that supported the filtering of water [wind carried mist (e.g., windage) and surface water runoff] surrounding the cooling towers prior to returning it back to the C-637-2A cooling tower basin from its construction in 1981 to 2016.
  - Building materials used for construction could contain lead-based paints.
  - Building debris generated from demolition of the structure (aboveground and subgrade) can be properly managed using standard demolition and waste management practices.

- Process knowledge and employee interviews indicate that the historical construction and system processes at C-637-6 involved equipment and chemicals that could have the potential to pose a release threat to the concrete pad and underlying soils. (See slide 6 for SWMU 89 details.)
  - C-637-6 is located within the footprint of the C-637 Cooling Tower.
  - C-637-6 filtered windage water and storm water runoff associated with the C-637 cooling towers that contained chromated water; making the slab, underlying soils, and surrounding area suspect for potential chromium contamination.
  - C-637-6 was connected to part of the RCW system (heating purposes) which contained chromated water.
  - Piped enclosed drains are located along the slab of the facility that drain into the C-637-2A cooling tower basin and the storm sewer.

C-637-6 Sand Filter Building - Conclusion and Recommendations

- Walkdown inspection of the facility, employee interviews, and other reviewed historical information did not identify any unusual conditions that would pose a potential threat of environmental release during future demolition of the structure (aboveground and subgrade).
  - Deactivation will include removal of any accessible loose items being stored and certain equipment (e.g., HPFW pumps and motors, electrical control panels, etc.) (to the extent practicable) prior to demolition.
  - Any floor drains (including the three pipe enclosed drains) will be delineated, documented, and isolated prior to demolition.
  - An evaluation will be made to determine if any measures may be appropriate to stabilize and/or isolate the subgrade structure (or portions thereof) prior to demolition.

- Pending completion of deactivation and availability of funding, proceeding with demolition and disposal of the C-637-6 facility (aboveground structure) outside of the FFA/CERCLA process, contingent upon the fact that no additional changes have occurred that would affect the CERCLA determination of the facility prior to demolition, is recommended.

- All applicable laws, regulations, and DOE procedures/protocols will be followed to ensure the demolition and disposal of the aboveground structure occurs in a safe, compliant manner, including conducting any additional radiological characterization through confirmation radiological surveys (as necessary) to support demolition and waste disposition.

C-637-6 Sand Filter Building - Conclusion and Recommendations

- Based on the construction and historical use at C-637-6, demolition and disposal of the aboveground structure for C-637-6 is recommended to be conducted outside of the FFA/CERCLA process.

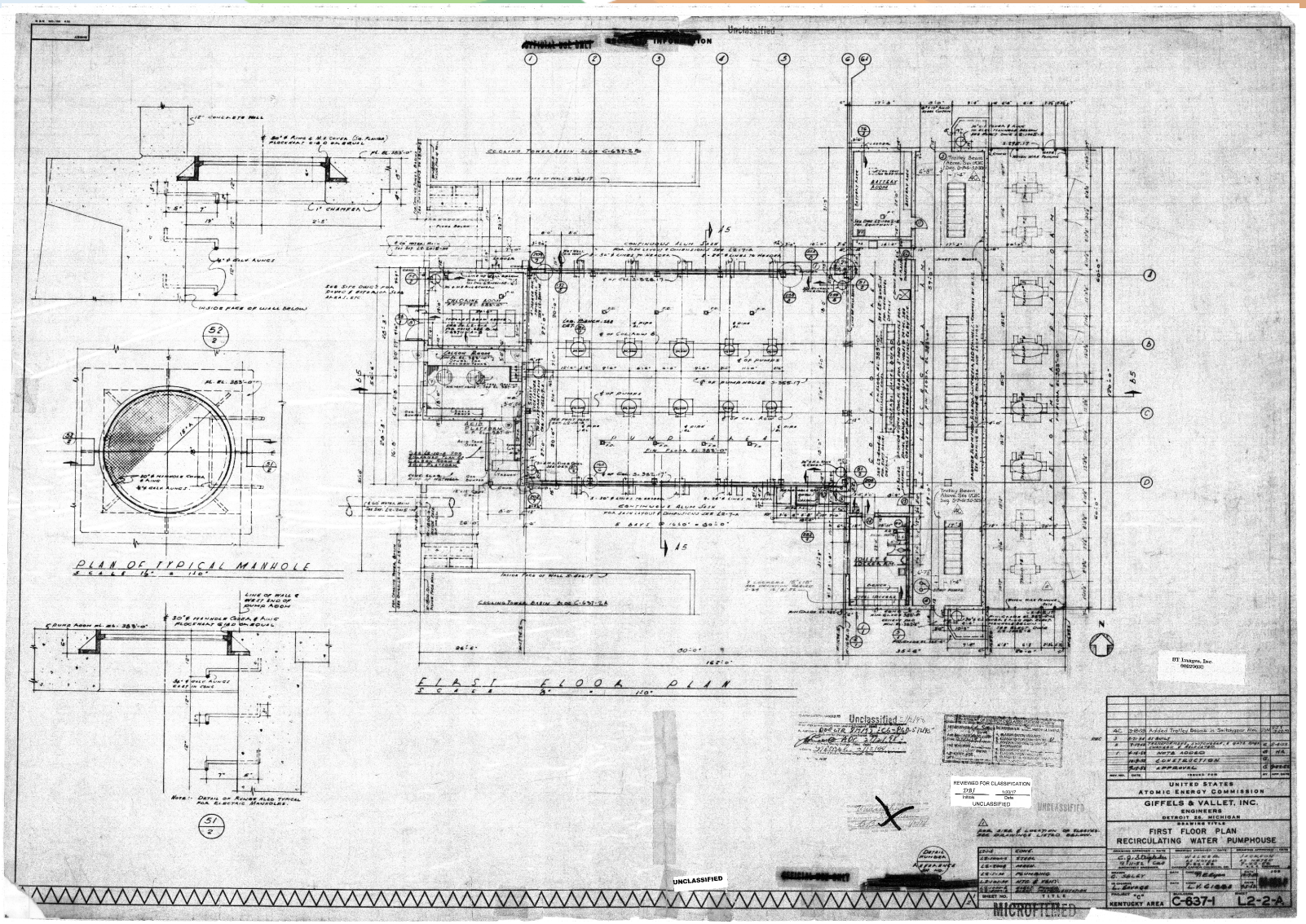
- As part of the demolition of the aboveground structure, the appropriate BMPs will be evaluated and implemented (as needed) to prevent/minimize the pooling and/or migration of storm water that may come into contact with any contamination that may exist on the pad/subsurface structure(s). For example, the following BMPs will be implemented as necessary:
  - Radiological surveying will occur following demolition.
  - Decontamination and/or application of fixatives and/or barriers to contaminated surfaces above regulatory posting limits.
  - Isolation measures and other types of barriers to minimize and/or control runoff/pooling of contaminated storm water [e.g., seal inlets to drains/sumps/subsurface structure(s)].

- Removal of the C-637-6 facility from the Facility D&D OU will be documented in the appropriate annual SMP revision.

- Based on the construction and historical use at C-637-6, it is recommended that the underlying and soils undergo further CERCLA evaluation as part of Soils and Slabs OU as currently identified in Appendix 4 of the SMP.
  - The SAR for SWMU 89 will be updated to clarify that the C-637-6 underlying slab (e.g., floor of subgrade structure) and associated soils constitutes the SWMU and will undergo a remedial field investigation as part of the Soils and Slabs OU.
  - Consideration will be given to coordinate the timing for issuance and finalization of a revised SAR for SWMU 89 that includes updated information on C-637-6 prior to removal of the structure.

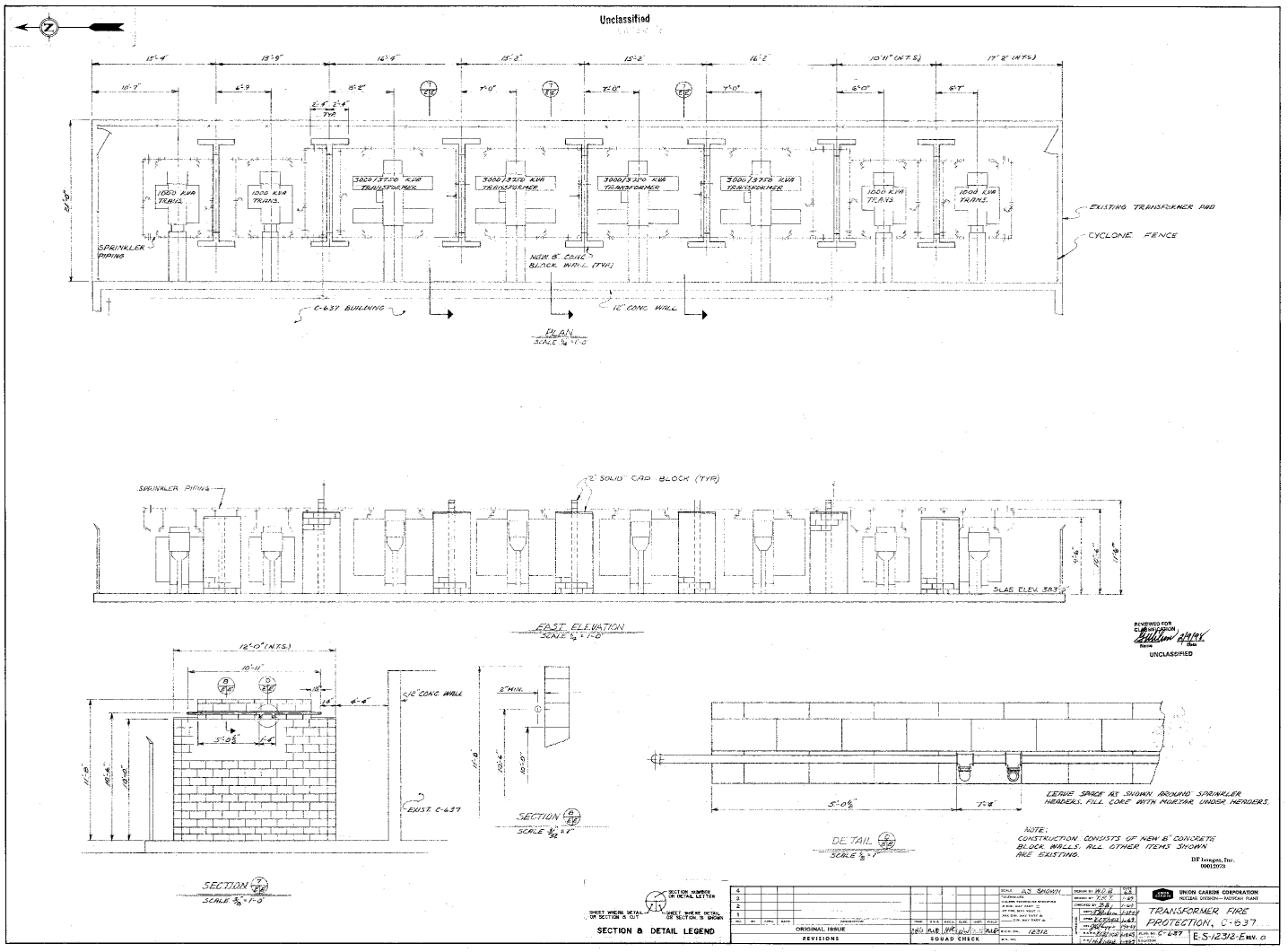
BACKUP INFORMATION

C-637-1 Engineering Drawings

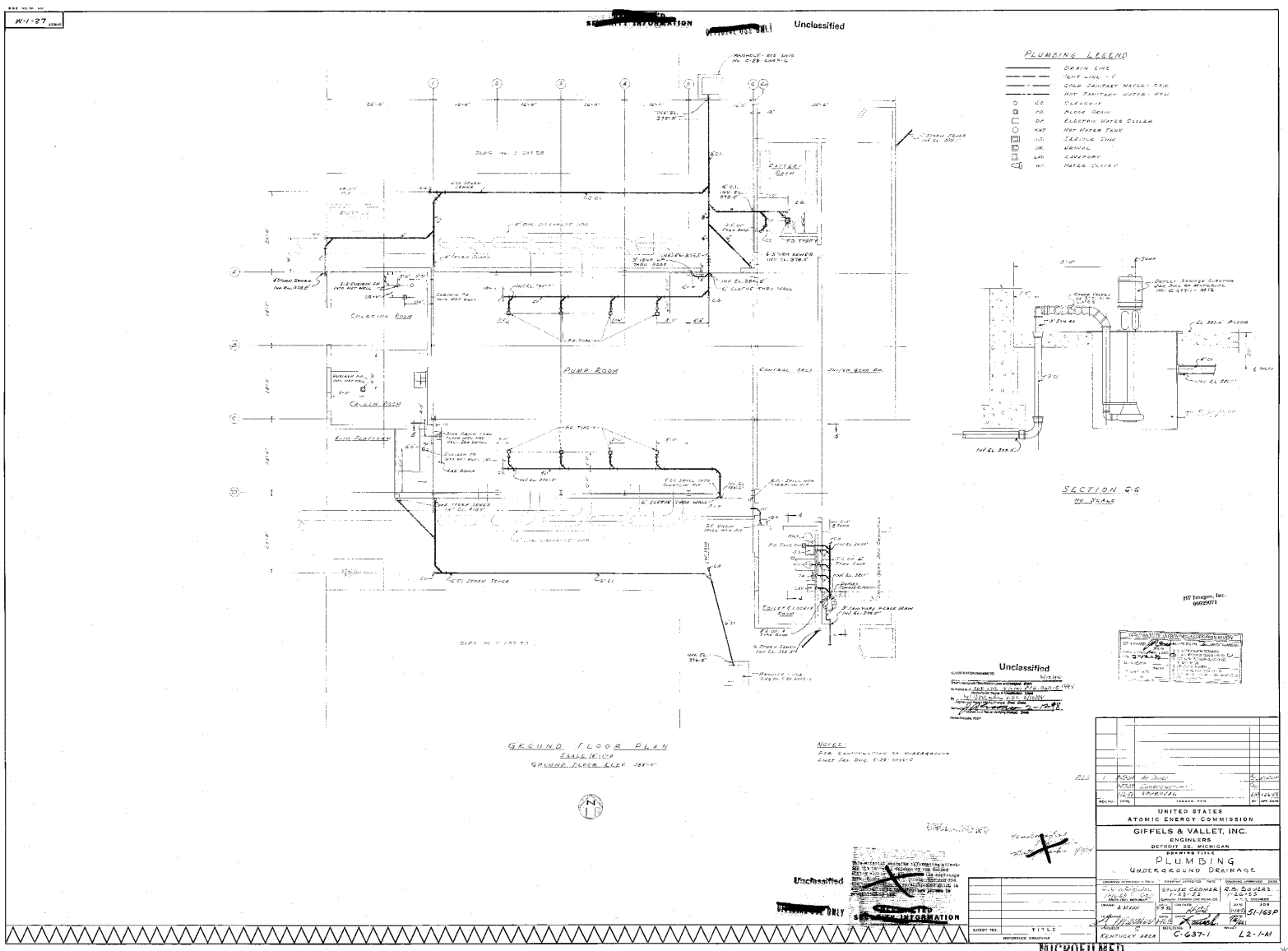


C-637-1; L2-2-A

C-637-1 Engineering Drawings

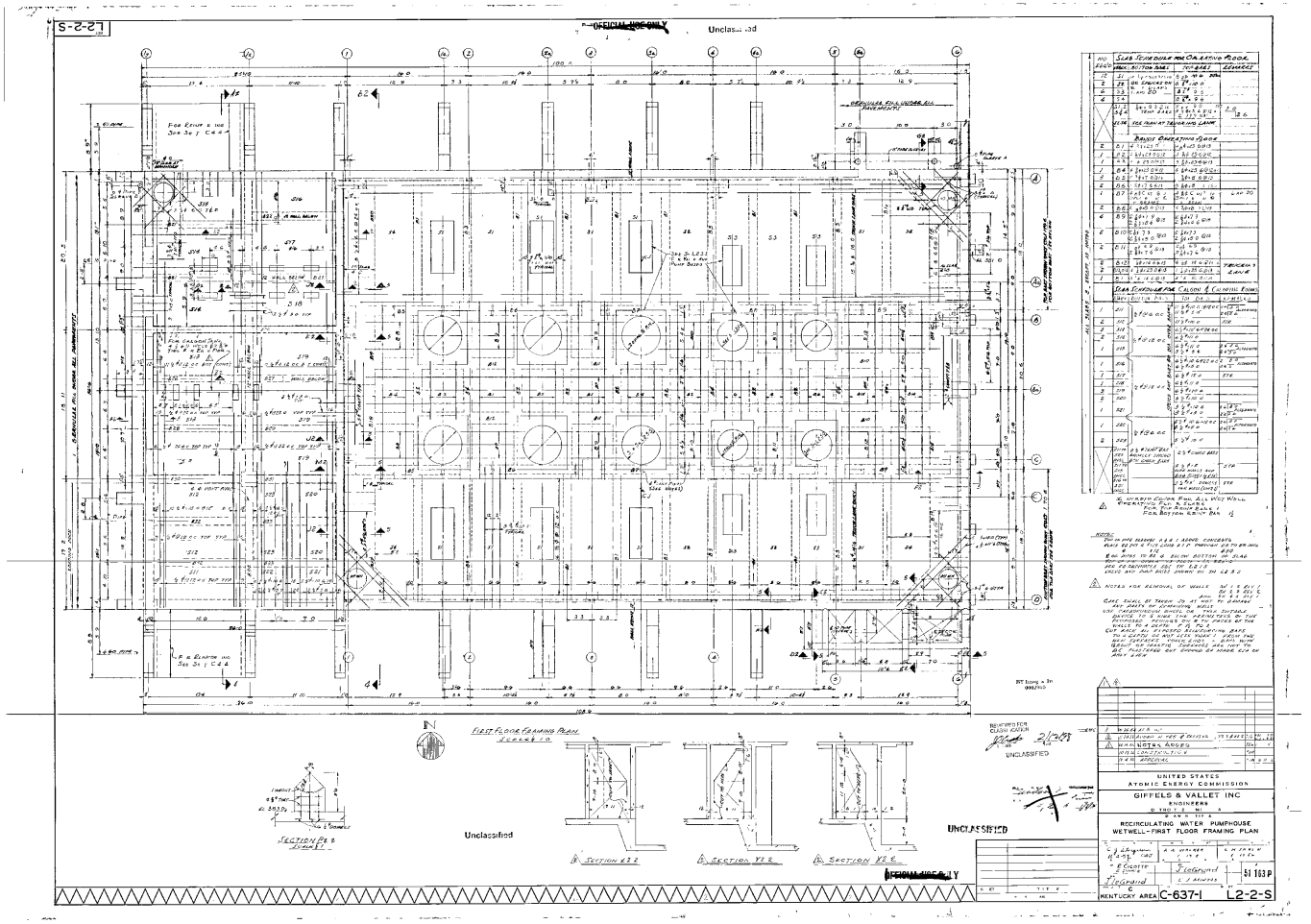


C-637-1 Engineering Drawings



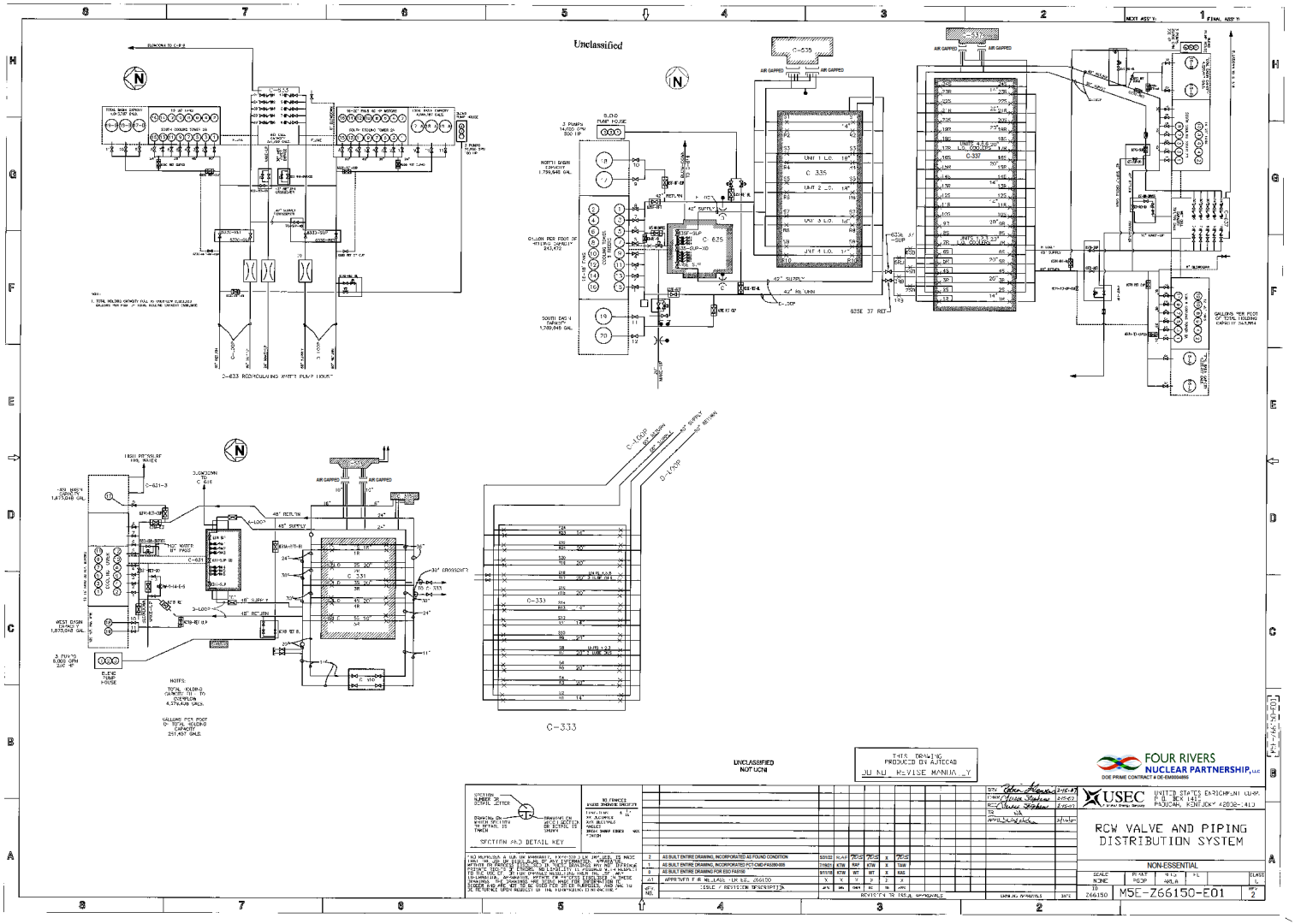
C-637-1, L2-1-M

C-637-1 Engineering Drawings



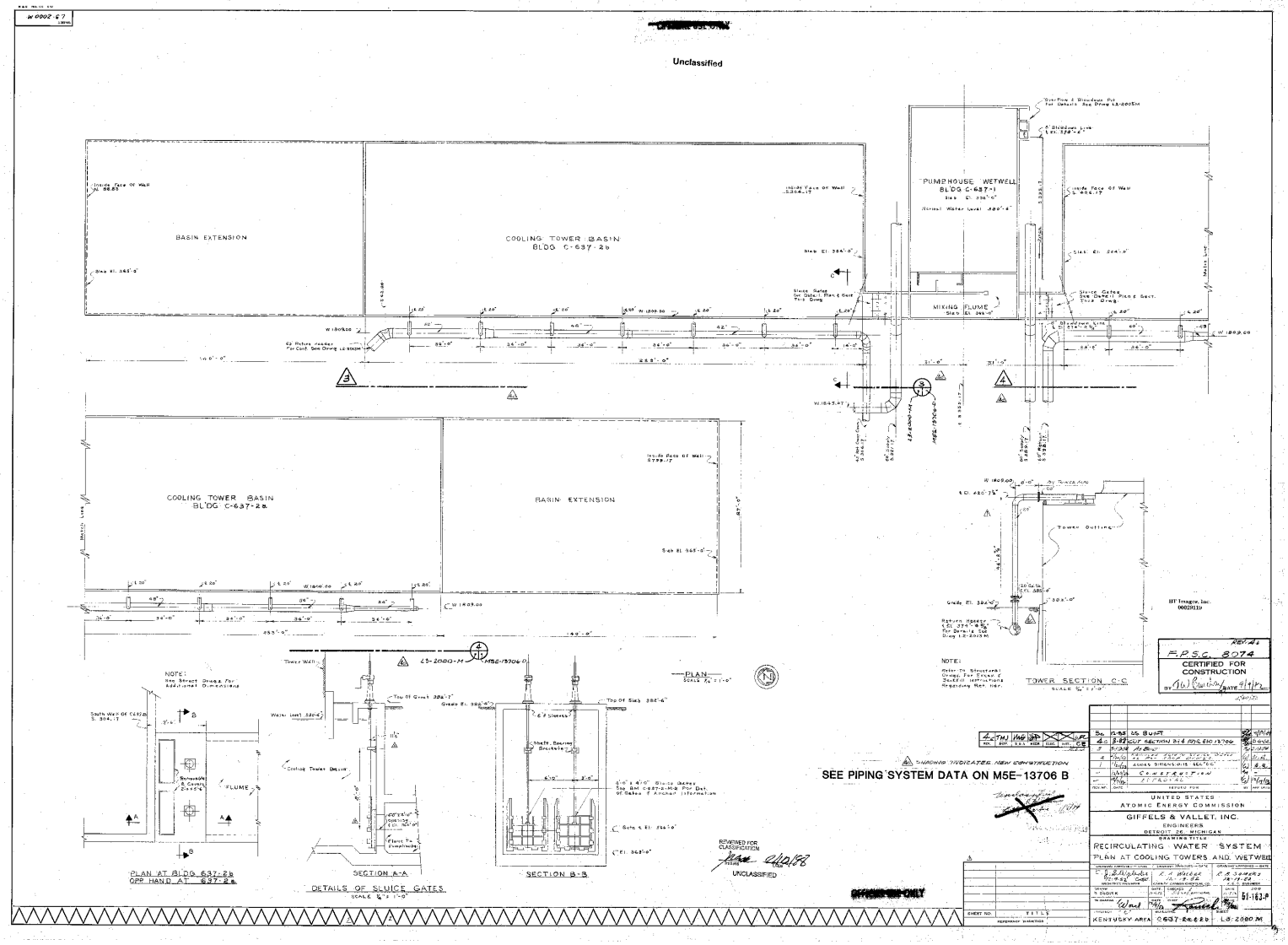
C-637-1; L2-2-S

C-637-1 Engineering Drawings



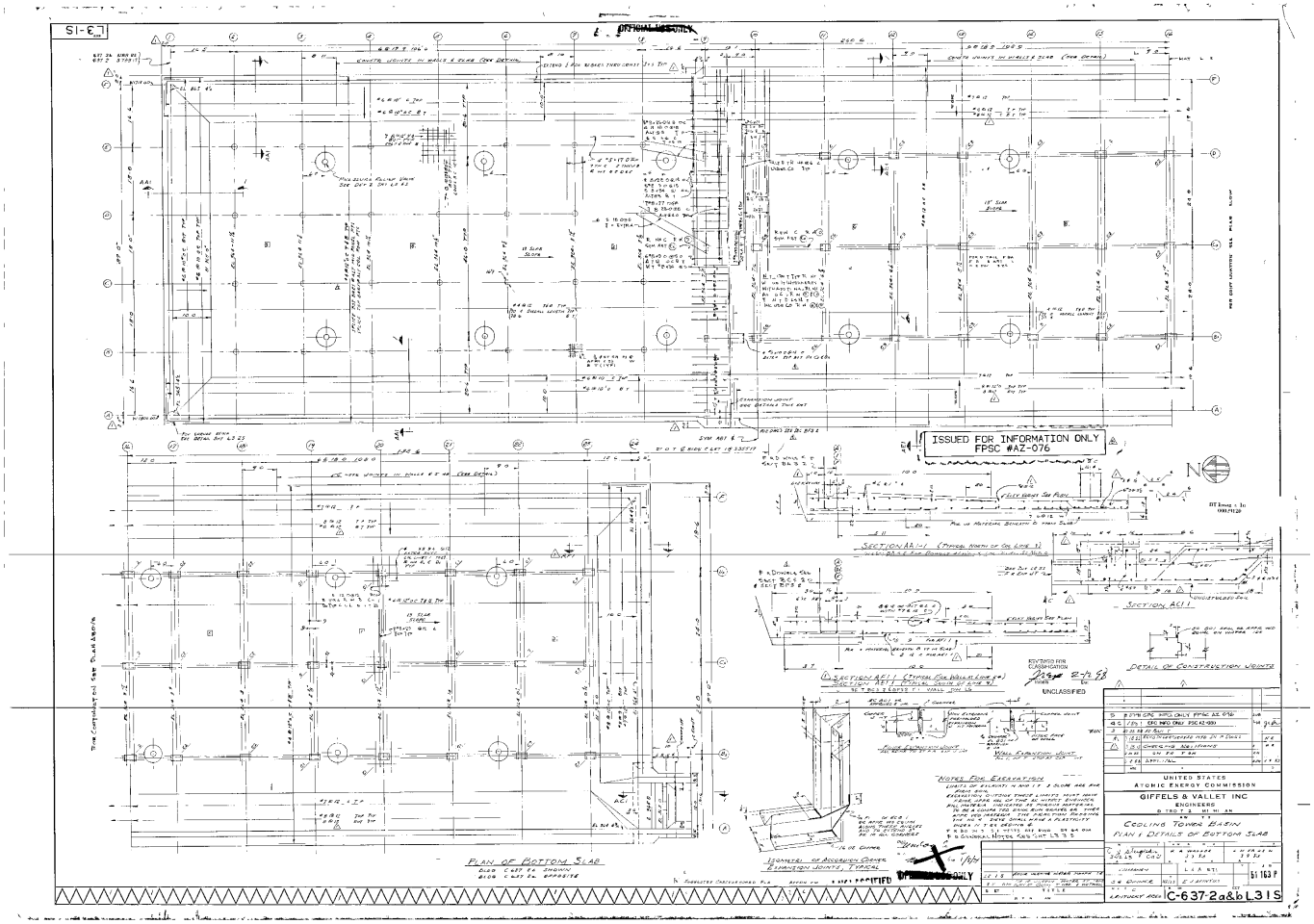
M5E-Z66150-E01, Rev 2

C-637-2A and C-637-2B Engineering Drawings



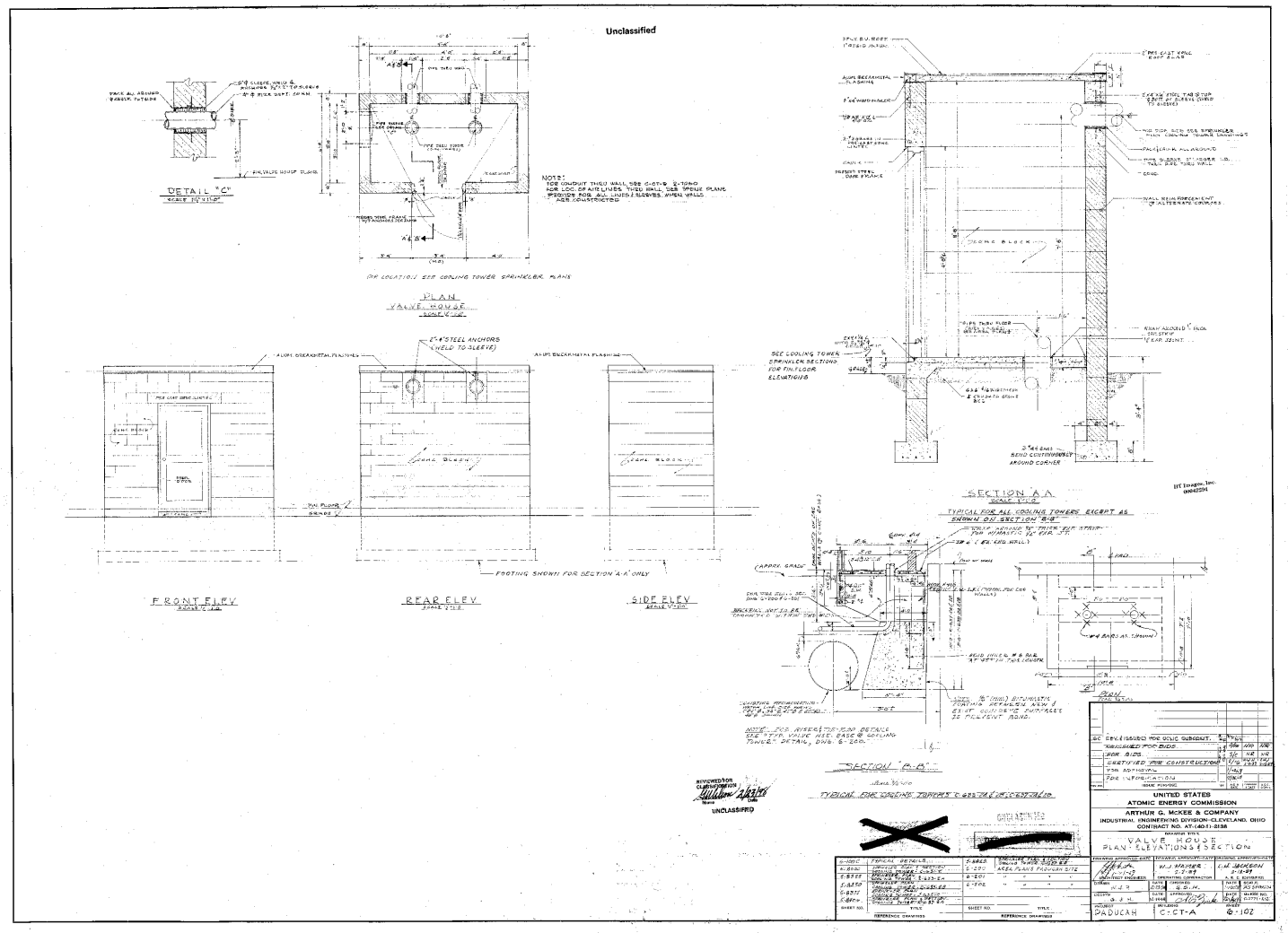
C-637-2A&B; L3-2000-M

C-637-2A and C-637-2B Engineering Drawings



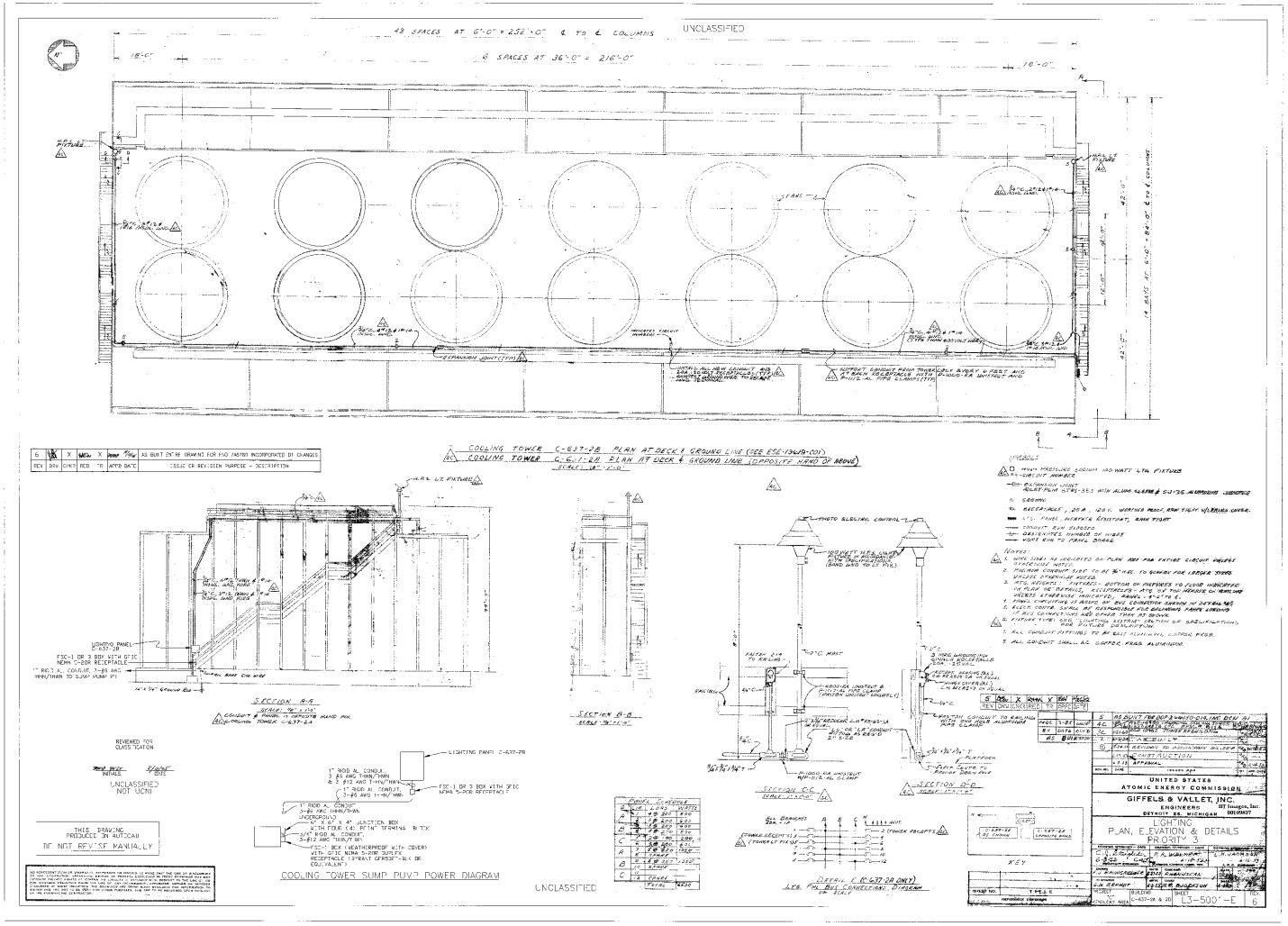
C-637-2A&B; L3-1-S

C-637-2A and C-637-2B Engineering Drawings



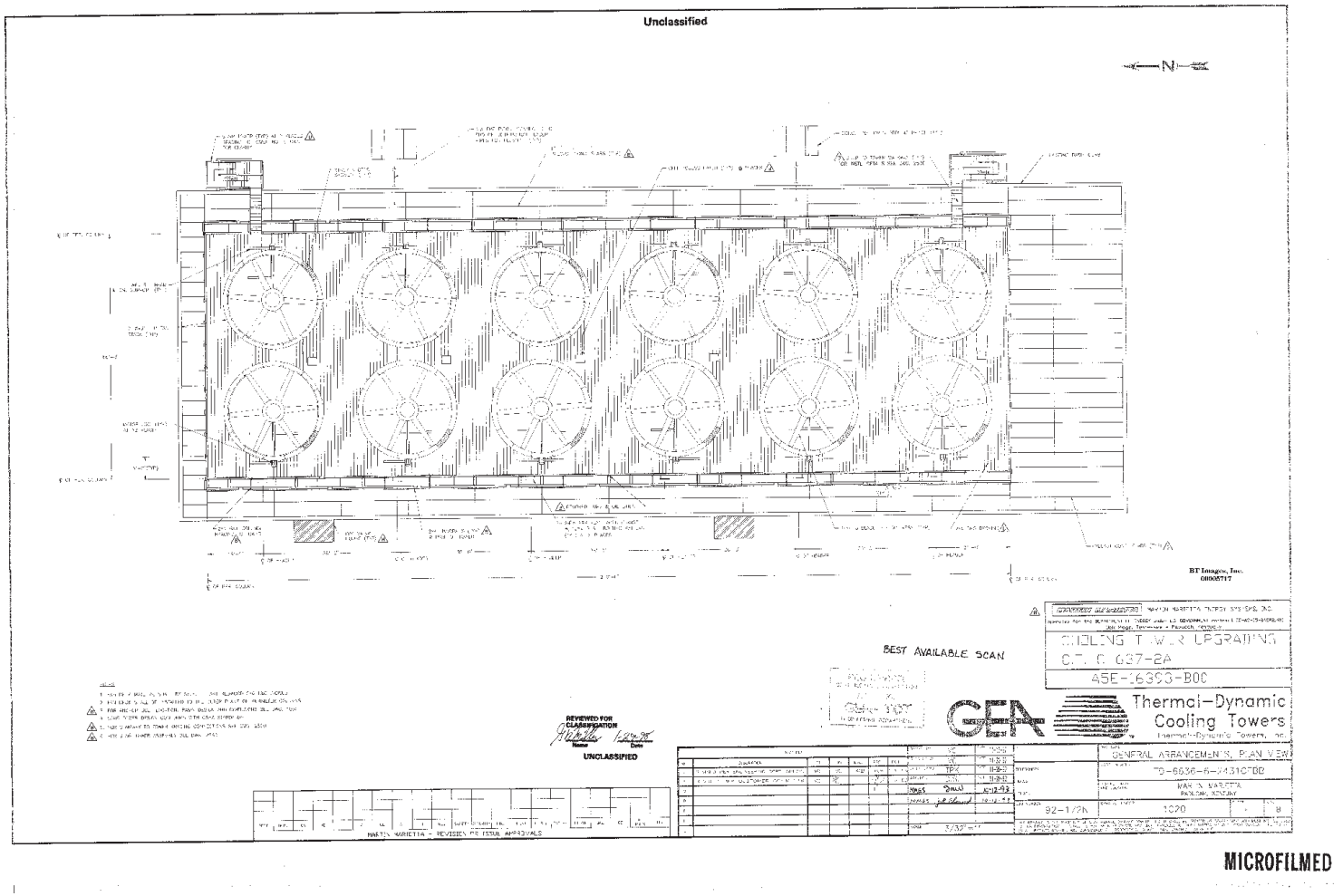
C-CT-A 6-102

C-637-2A and C-637-2B Engineering Drawings



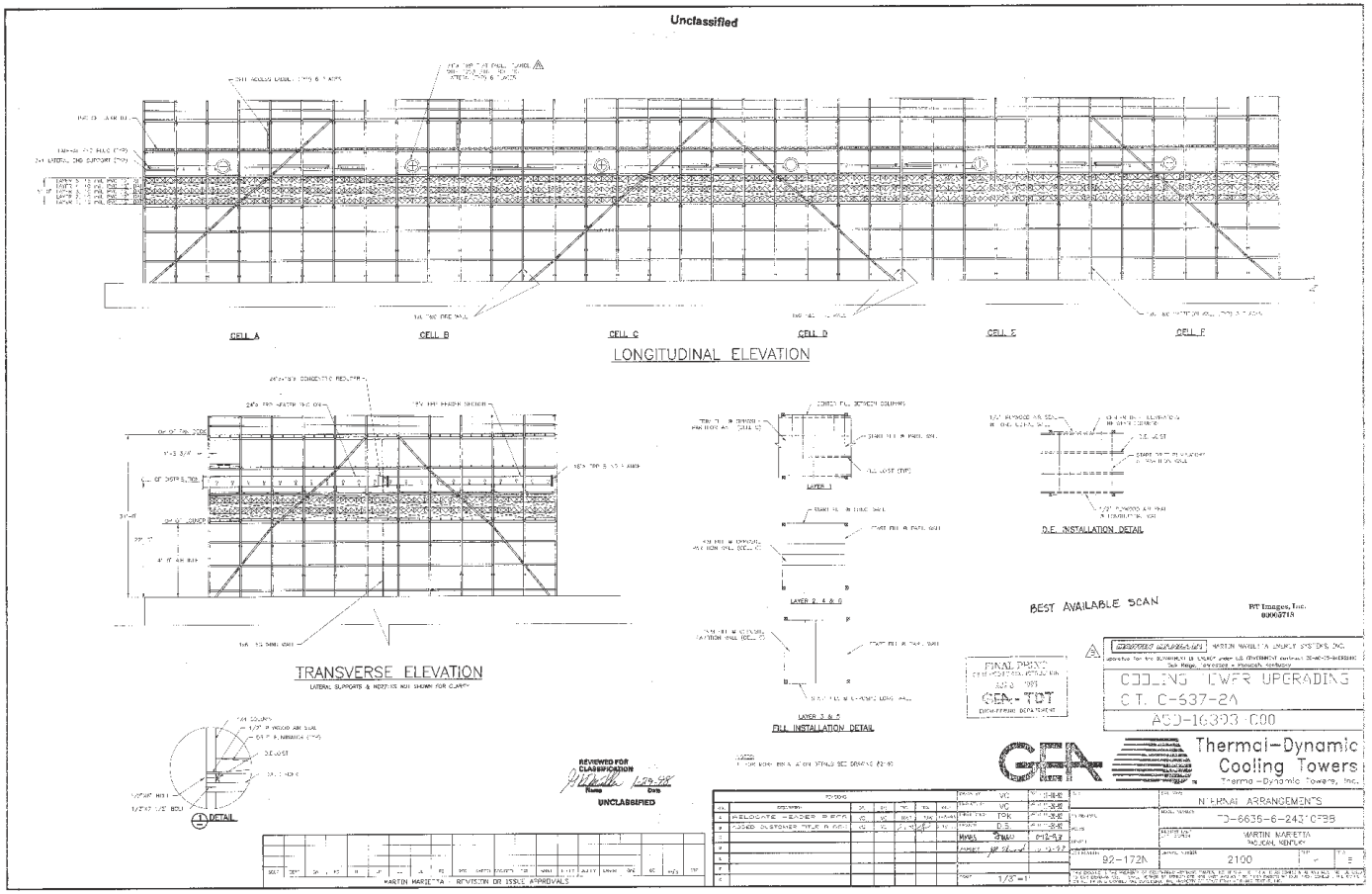
C-637-2A&2B; L3-5001-E
(Original Tower)

C-637-2A and C-637-2B Engineering Drawings



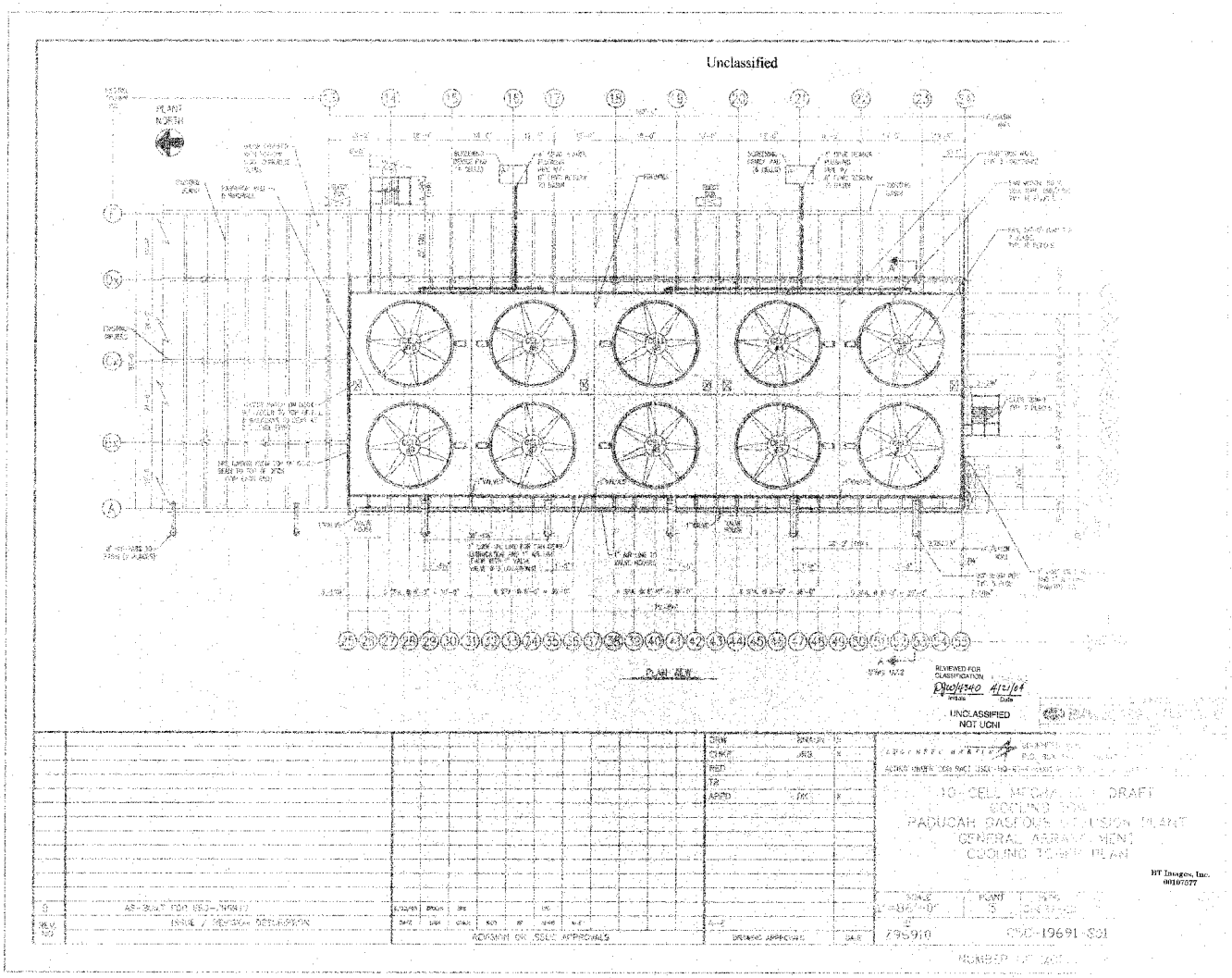
C-637-2A; A5E-16393-B00(1020)
(New Tower)

C-637-2A and C-637-2B Engineering Drawings



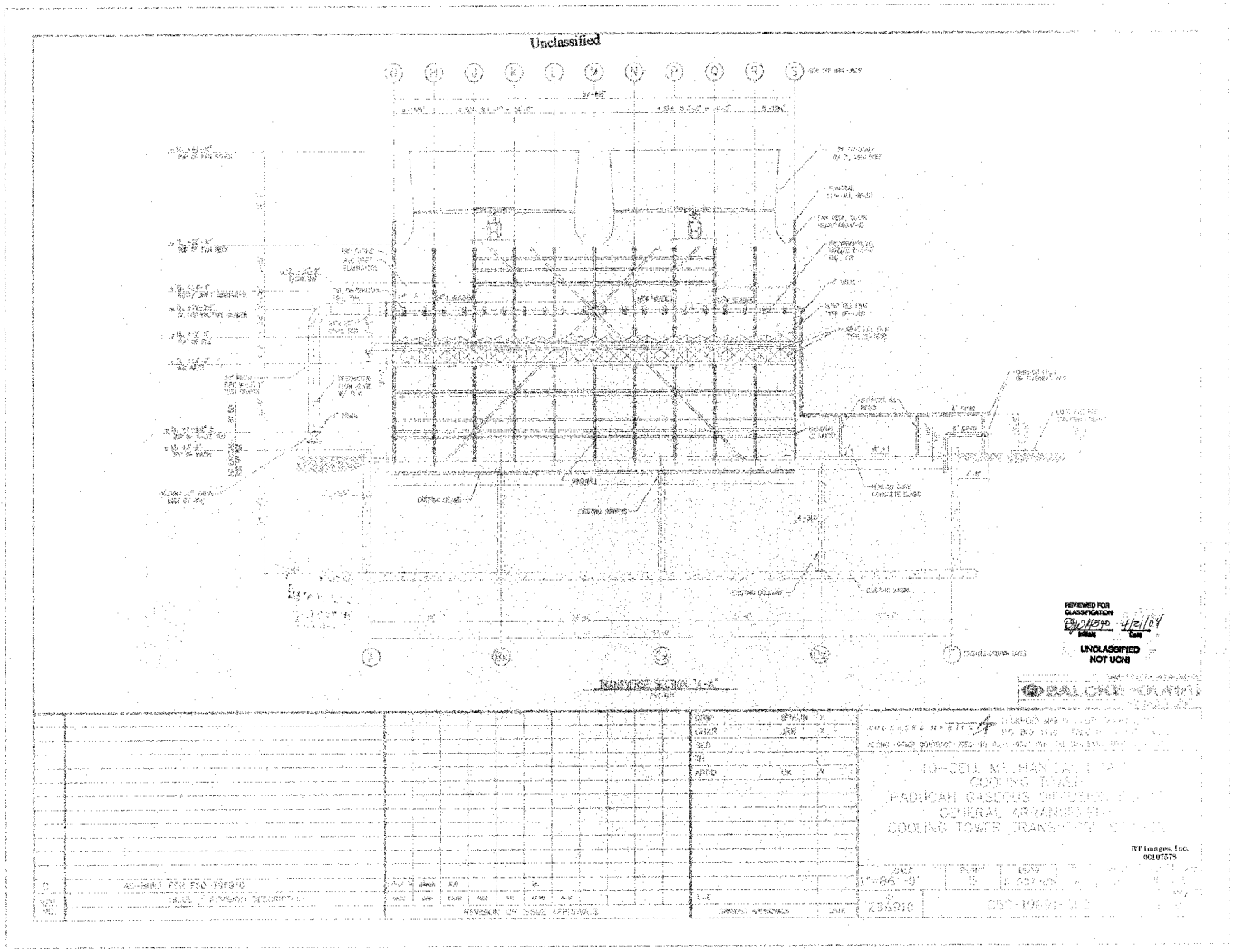
C-637-2A; A5D-16393-C00(2100)
(New Tower)

C-637-2A and C-637-2B Engineering Drawings



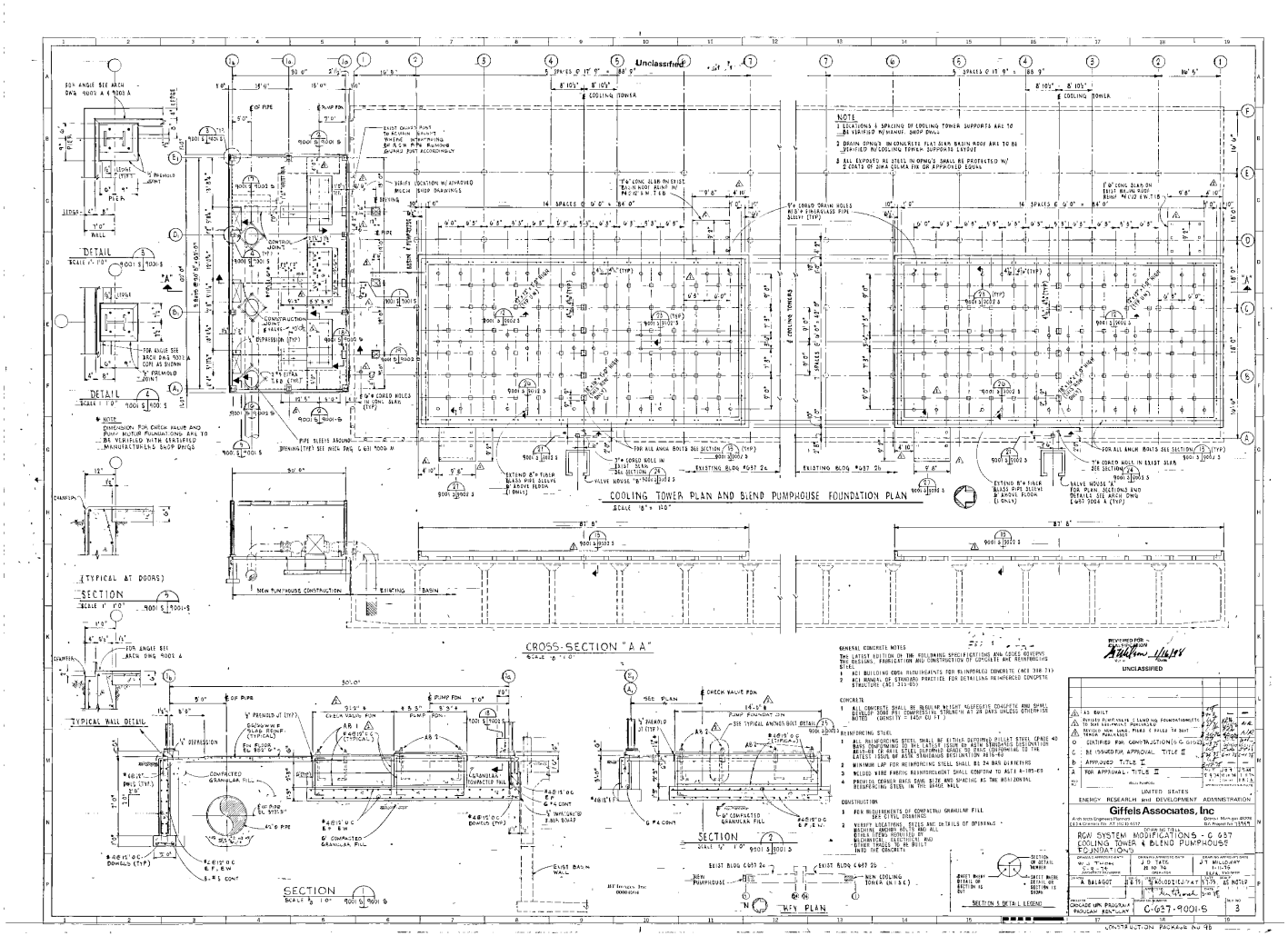
C-637-2B; C5C-19691-S01
(New Tower)

C-637-2A and C-637-2B Engineering Drawings



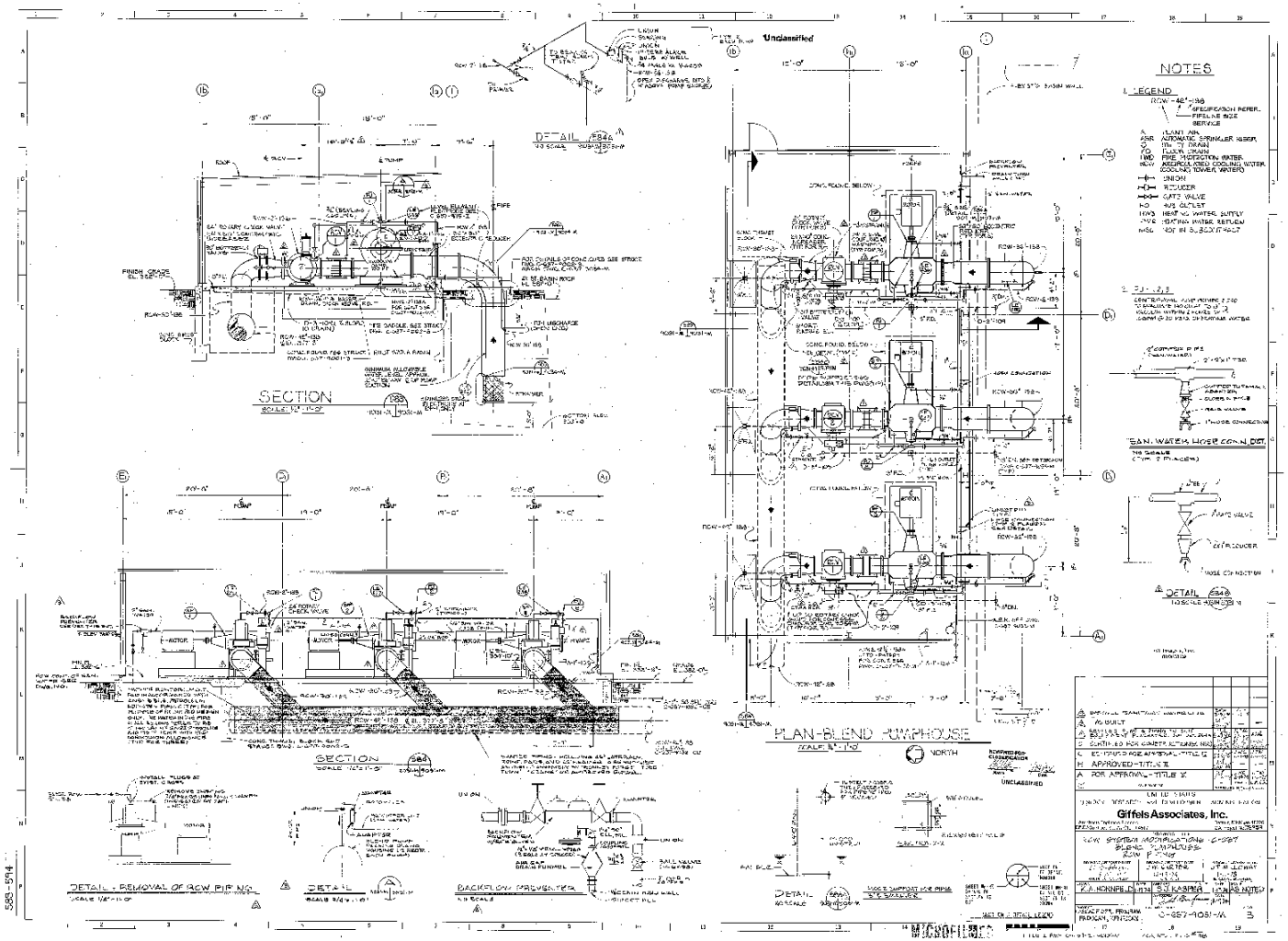
C-637-2B; C5C-19691-S02
(New Tower)

C-637-3 Engineering Drawings



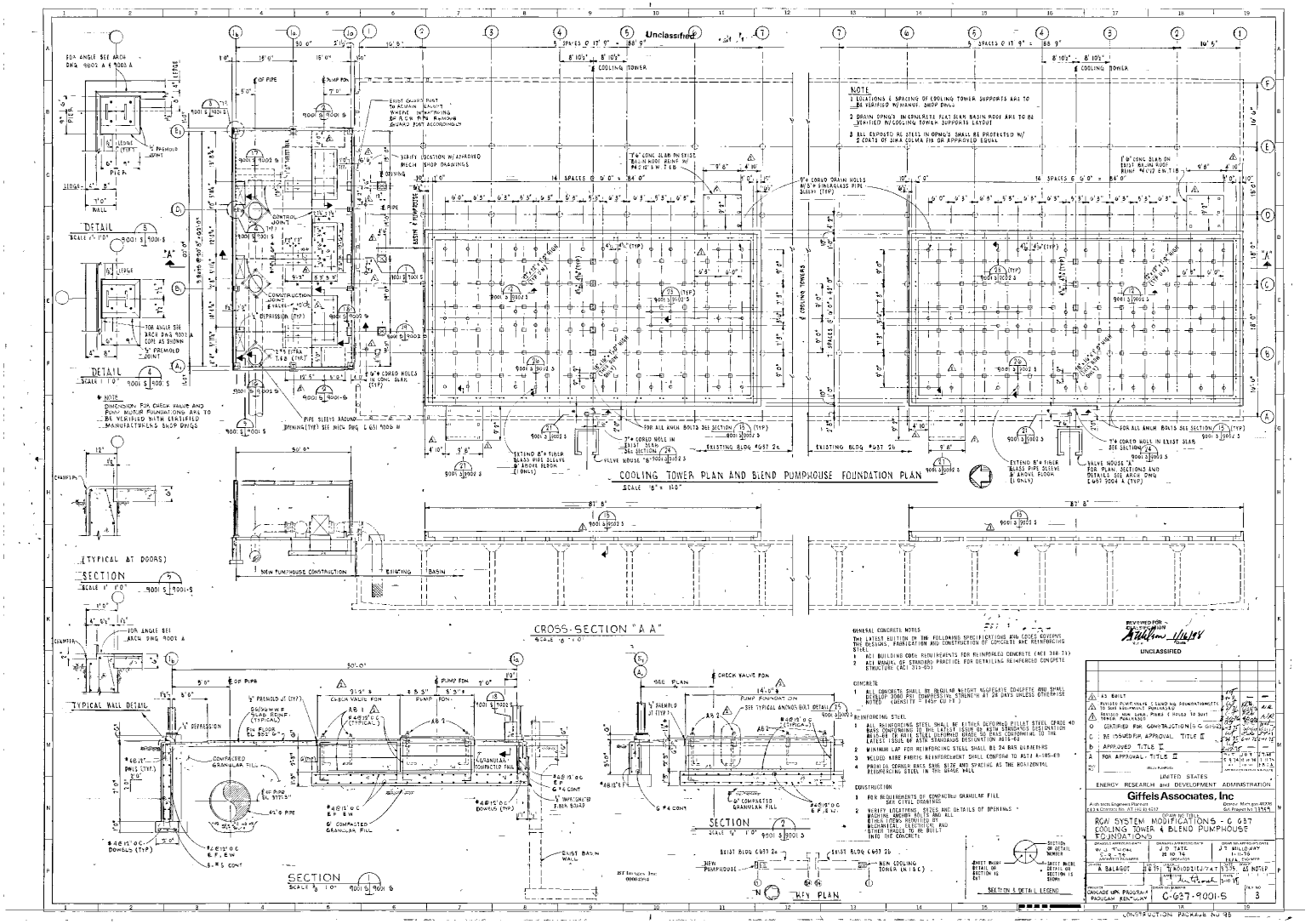
C-637-9001-S, Rev 3

C-637-3 Engineering Drawings



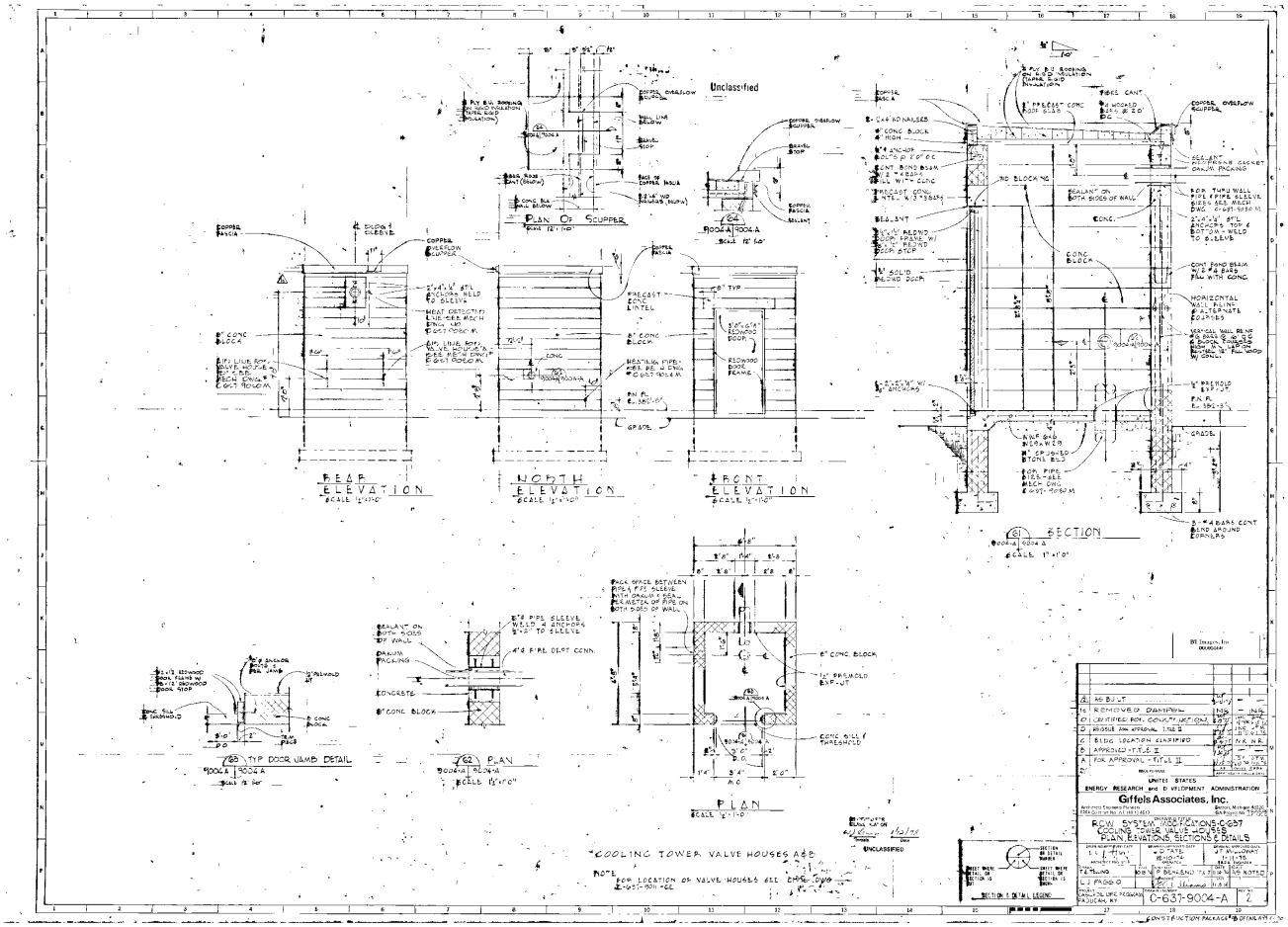
C-637-9031-M, Rev 3

C-637-4 and C-637-5 Engineering Drawings



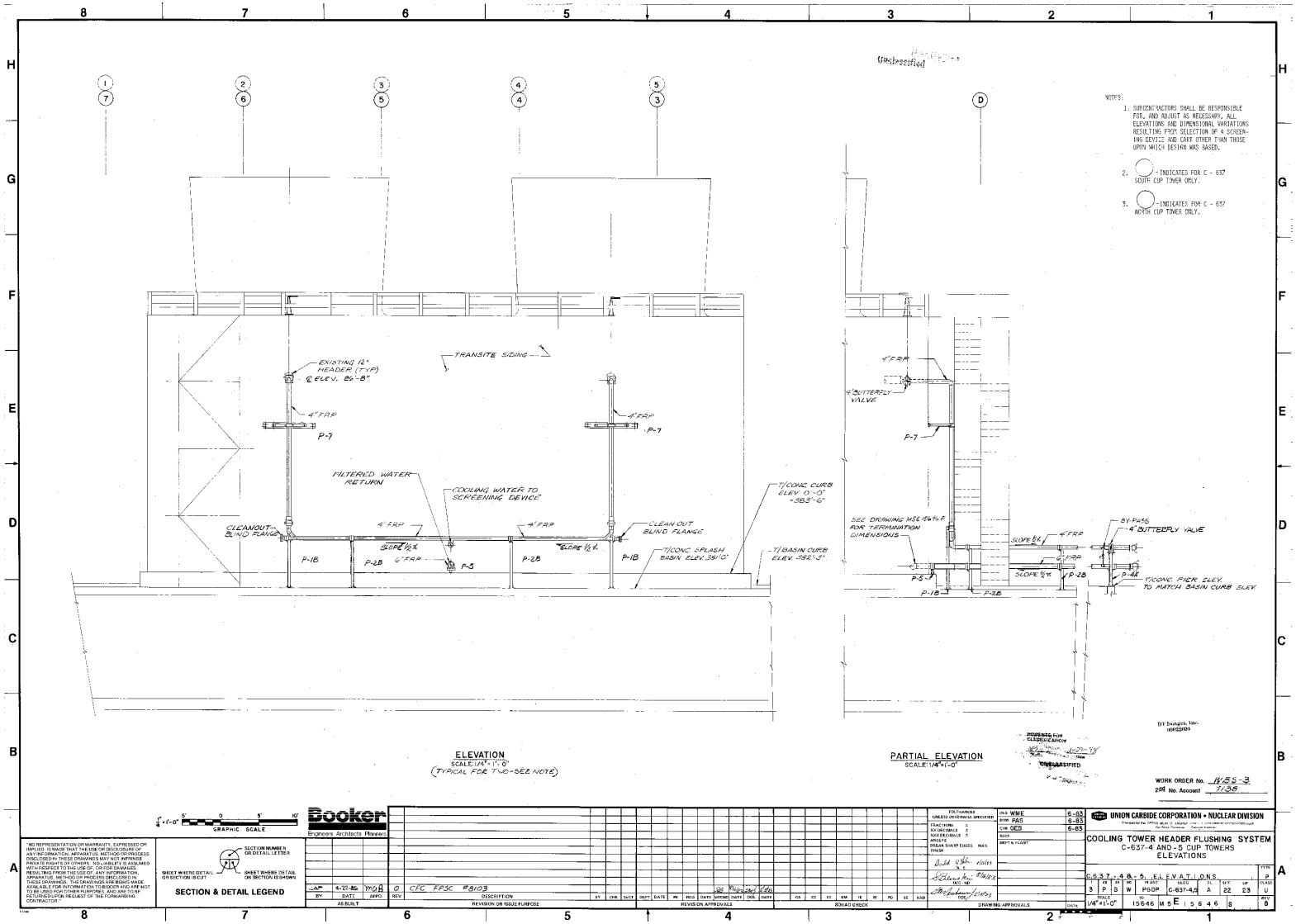
C-637-9001-S, Rev 3

C-637-4 and C-637-5 Engineering Drawings

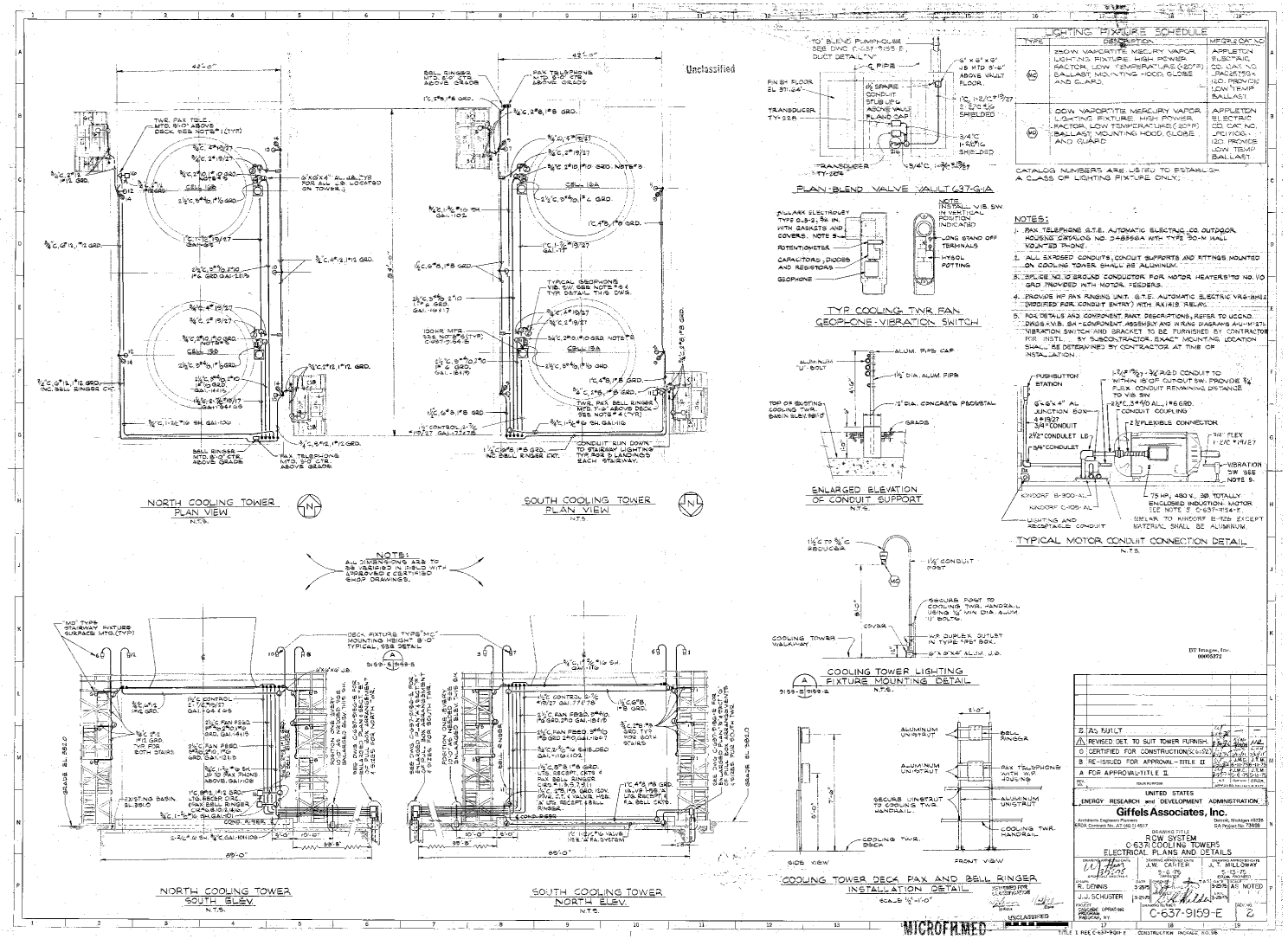


C-637-9004-A; Rev 2

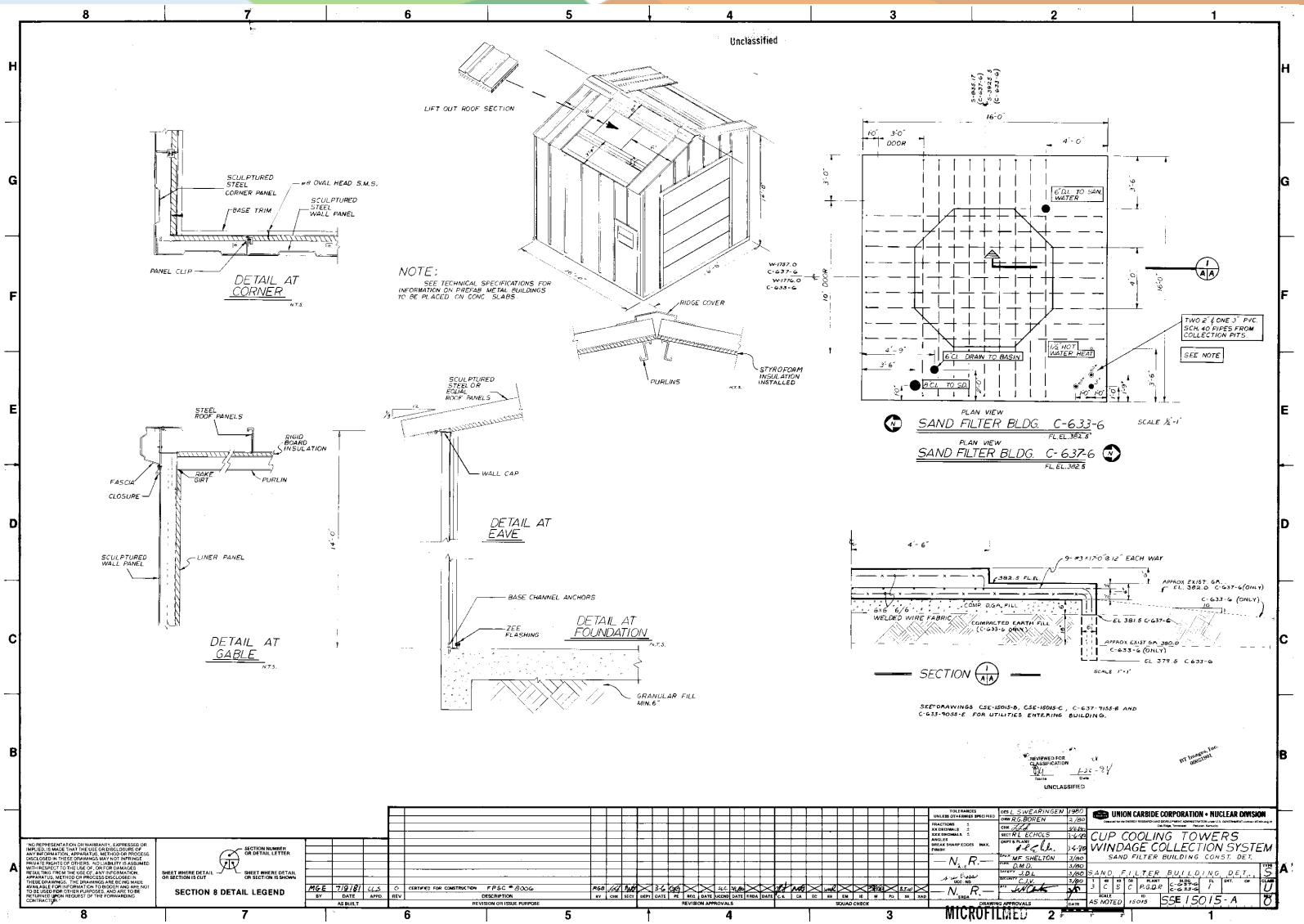
C-637-4 and C-637-5 Engineering Drawings



C-637-4 and C-637-5 Engineering Drawings

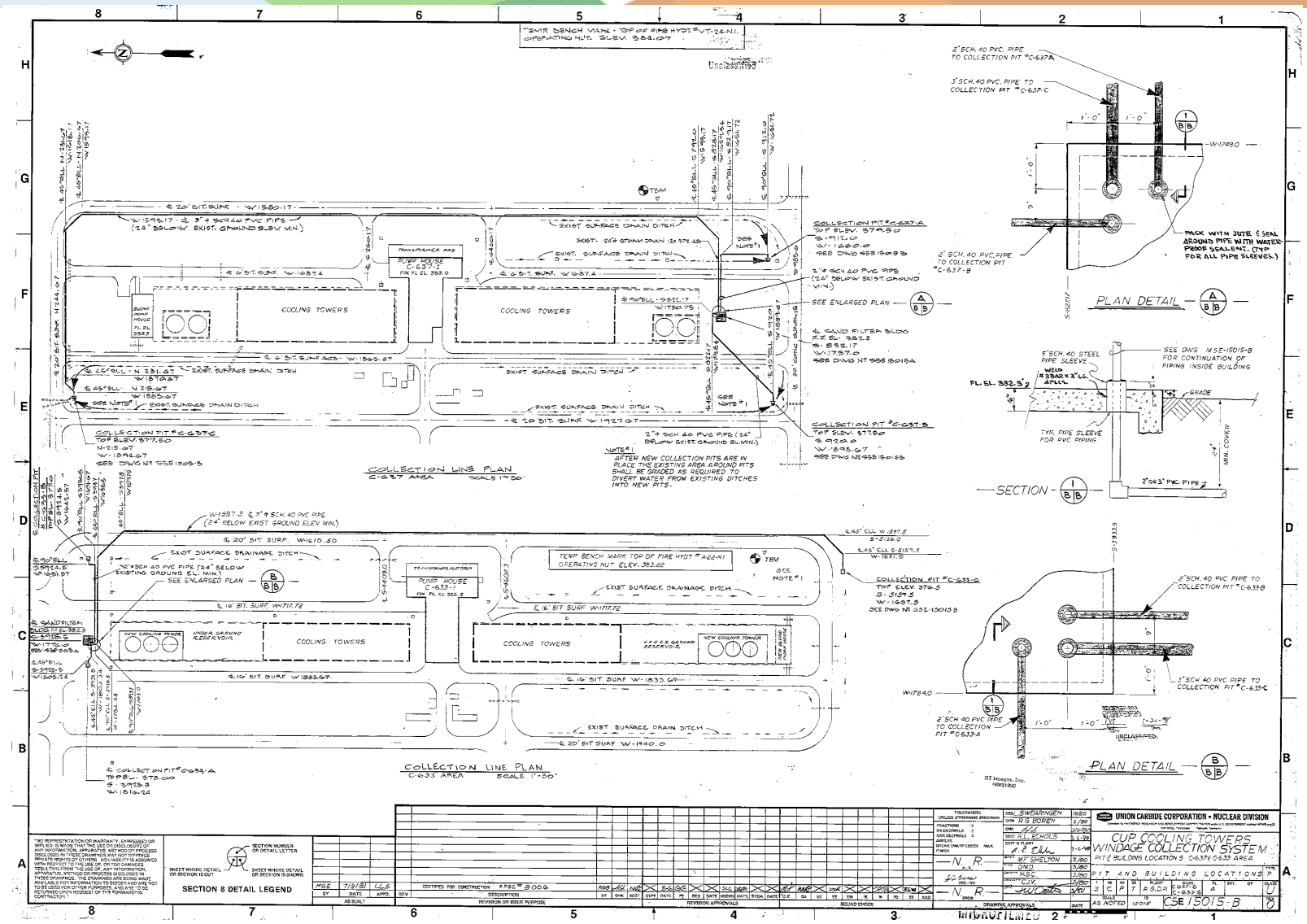


C-637-6 Engineering Drawings



S5E-15015-A, Rev 0

C-637-6 Engineering Drawings



C5E-15015-B, Rev 0

C-637 Pumphouse and Cooling Tower (SWMU 89) Sources

- Engineering Drawings:
  - Provided in presentation
- Databases:
  - USEC's BPS
  - Issues Management System
  - Regulatory Compliance Archive Spill Log (pre-2018)
  - PCB Database (1989 – 2021)
  - Active GSAs and SAAs Master List
  - Asbestos Walkdown (October 2020)
- Employee Interviews:
  - Utility Operations Subject Matter Expert (45 years plant expertise; operator/manager/supervisor)
  - Power Operations Subject Matter Expert (31 years plant expertise)
  - Compliance Subject Matter Expert (45 years plant expertise; trained on system)
  - Systems Engineer (Lead) Subject Matter Expert (34 years plant expertise)
  - Systems Engineer (Senior) Subject Matter Expert (32 years plant expertise)
  - Chemical Engineer Subject Matter Expert (31 years plant expertise)
  - Environmental Compliance Subject Matter Expert (30 years plant expertise)
  - Plant Engineer (NE Plume) Subject Matter Expert (17 years plant expertise)

C-637 Pumphouse and Cooling Tower (SWMU 89) Sources

- Documents:
  - Paducah Gaseous Diffusion Plant Sitewide Strategy Facility Background Information, FPDP-RPT-0021, May 2016
  - Report for Environmental Audit Supporting Transition of the Gaseous Diffusion Plants to the United States Enrichment Corporation, DOE/OR/1087&V5 (June 1993)
  - Paducah Asbestos Survey Executive Summary (Lee Wan Report), October 1990
  - Cultural Resource Management Plan for the Paducah Gaseous Diffusion Plant Paducah, Kentucky, BJC/PAD-691, May 2005
  - Operations Division Training Manual – Utilities Operations, KYD-1482, July 1962
  - Evaluation of Corrosion Inhibitors for Open Recirculating Water Systems, KY-455, May 1964
  - Cooling Tower Drift Studies at the Paducah, Kentucky Gaseous Diffusion Plant, Conf-790109-1, January 1979
  - Paducah Gaseous Diffusion Plant Environmental Report for 1980, KY-717, May 1981
  - Paducah Gaseous Diffusion Plant Environmental Report for 1985, KY-756, May 1985
  - Paducah Gaseous Diffusion Plant Environmental Report for 1988, ES/ESH-8/V3, May 1989
  - Paducah Gaseous Diffusion Plant Environmental Report for 1990, ES/ESH-18/V3, September 1991
  - 2018 Annual Hazardous Waste Report, Assessment Return, and Claim for Exclusion for the Paducah Gaseous Diffusion Plant, McCracken County, Kentucky, Permit Number KY8-890-008-982, Summary of Noncompliance, 2018
  - Specifications for CUP Cooling Tower Windage Collection System at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, PAD/LSCR-004324, March 1980

C-637 Pumphouse and Cooling Tower (SWMU 89) Sources

- Documents: (Continued)
  - Record of Decision for Interim Remedial Action at the Northeast Plume, Paducah Gaseous Diffusion Plant, Paducah Kentucky, DOE/OR/06-1356&D2, June 1995
  - Postconstruction Report for the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1555&D1, January 1997
  - Explanation of Significance Differences to the Record of Decision for the Interim Remedial Action of the Northeast Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/LX/07-1291&D2/R2, November 2015