

6.1.5 Draft System Transient Design Pressures

The AQC equipment additions and changes to all of the Mill Creek units will likely be considered major alterations or extensions to the existing facilities per the National Fire Protection Association (NFPA) 85 code - Section 1.3 (2007 Edition). Furthermore, Section 6.5 of NFPA 85, in this instance, would imply that the existing furnace, or boiler, be designed for transient pressures of ± 35 inwg at a minimum. Black & Veatch is in the process of receiving and reviewing documentation confirming the boiler transient design pressures for each Mill Creek unit. Once all documentation is received and processed, Black & Veatch will have a better understanding of which boilers, if any, may require stiffening.

The code however acknowledges that an exception could be taken if the expense for modifying the existing boiler framing system would be disproportionate to the amount of increased protection as long as a reasonable degree of safety can be provided. The “burden” for proving to the authority having jurisdiction (AHJ) whether a reasonable degree of safety can be provided would fall to the User or their Engineer. In Section 1.4.3 NFPA 85 permits the AHJ to deviate from these requirements if deemed impractical to upgrade the existing facility to meet the latest code requirements and provided that a reasonable degree of safety can be provided without upgrading to the full extent of the code.

With the addition of the proposed Mill Creek AQC equipment for this study, this may be an instance where consideration should be given for deviating from these requirements. The basis for this line of reasoning is supported by the explanatory language in the Annex material. Section A.1.4 of NFPA 85 states that:

“Users of equipment covered by this code should adopt those features that they consider applicable and practicable for existing installations. Physical limitations could cause disproportionate effort or expense with little increase in protection. In such cases, the authority having jurisdiction should be satisfied that reasonable protection is provided.

In existing units, any condition that represents a serious combustion system hazard should be mitigated by application of appropriate safeguards.”

The design process of the recently installed Units 3 and 4 SCR systems would have required an analysis of the boiler transient design pressures as previously discussed, and possibly boiler stiffening. Since the Units 3 and 4 SCR systems are in place, it is expected that the SCR systems for Units 1 and 2, as well as other Mill Creek AQC upgrades, could be installed without the addition of cost prohibitive boiler stiffening.

Black & Veatch is also in the process of receiving documentation stating the existing draft system (ductwork and AQC equipment) transient design pressures for Mill Creek. Black & Veatch will have a better understanding of which draft system sections may require stiffening once all of the documentation is received. If stiffening is required, though, it is not expected to be of the cost prohibitive nature of boiler stiffening.

Each new piece of AQC equipment, and its associated new ductwork, being considered for the Mill Creek units between the boiler outlet and the ID fan inlet will be required to meet the NFPA 85 \pm 35 inwg requirement per Section 6.5 of NFPA 85. It should be implied that ID fans, in this code, include booster fans. Due to this requirement calculated transient design pressures below \pm 35 inwg are disregarded and the \pm 35 inwg is used as the design transient pressure for that draft system component or section of ductwork. For calculated transient design pressures over \pm 35 inwg the calculated pressure is used. Sections of the Mill Creek draft systems that would likely be exposed to pressures beyond the \pm 35 inwg minimum are the new NID (or PJFF) systems and ID fan inlet ductwork on Units 1 and 2. This may apply to other sections of the Mill Creek draft systems as well.

The Black & Veatch philosophy for calculating the minimum required transient design pressures is based on the draft system being designed to 66 percent of its yield stress for maximum continuous (fan Test Block at ambient conditions) operating pressures and 95 percent for short durations, or transient conditions. This results in a 44 percent increase in the allowable stress throughout the draft system for short durations without resulting in permanent deformation or buckling of any structural components. For example, if a section of ductwork is expected to be exposed to negative draft pressures of -30 inwg when the ID fans are operating at Test Block conditions under ambient conditions, the calculated negative transient design pressure would be 44 percent higher or -43.2 inwg. The positive transient design pressure would still be +35 inwg.

6.2 Auxiliary Electrical System Analysis

The existing Mill Creek auxiliary power systems includes outdoor 13.8 kV switchgear in a main-tie-main bus configuration fed at each end by one of two 345/138/13.8 kV Auto transformers. The outdoor 13.8 kV switchgear provides startup/backup power for each unit and the station auxiliary electrical systems. The

outdoor 13.8 kV switchgear bus A feeds 13.8/4.16 kV reserve auxiliary transformer A and U1/U2 scrubber transformer A, and bus B feeds 13.8/4.16 kV reserve auxiliary transformer B and U1/U2 scrubber transformer B. Each 13.8 kV switchgear bus has a spare circuit breaker position for future use. Each 13.8/4.16 kV transformer has three windings. The two reserve auxiliary transformers are connected in an “A” or “B” fashion to each of the units’ 4.16 kV auxiliary electrical alternate/back-up incoming circuit breakers for startup and backup power. In addition, the two reserve auxiliary transformers feed the 4.16 kV station feeder switchgear which is arranged in a main-tie-main bus configuration.

Units 1 and 2 auxiliary electrical system 4.16 kV switchgear buses are fed from their own respective one three-winding main auxiliary transformer that is powered from their respective generator leads. Units 3 and 4 auxiliary electrical system 4.16 kV switchgear buses are fed from their own respective two three-winding main auxiliary transformers that are powered from their respective generator leads. All units have four auxiliary electrical system 4.16 kV switchgear buses. Units 3 and 4 each have their own respective 4.16 kV scrubber switchgear in a main-tie-main bus configuration that are fed from their respective unit auxiliary electrical system 4.16 kV switchgear buses. Unit 1 and 2 4.16 kV scrubber switchgear buses are fed from the U1/U2 scrubber transformers A and B described above.

The WFGD (Unit 4 only) and PJFF, or NID technology options will require the addition of new booster or new ID fans. The existing main auxiliary transformers, reserve auxiliary transformers, and 4.16 kV switchgear buses were determined to have insufficient spare capacity, short circuit rating, and voltages to power the AQC options that include new technology and booster/ ID fan electrical loads.

Based on using variable frequency drives for the ID and booster fans, Units 1, 2, and 3 will require one new two-winding 22 kV – 4.16 kV AQC main auxiliary transformer (MAT) that will be fed from their respective generator leads. Based on using variable frequency drives for the booster fans, Unit 4 will require one new three-winding 22 kV – 4.16 kV – 4.16 kV AQC MAT that will be fed from the Unit 4 generator leads. The secondary windings will power the new AQC 4.16 kV switchgear buses for the fans and other various AQC loads. The alternate/backup power for new AQC 4.16 kV switchgear buses will be fed from new AQC 4.16 kV reserve switchgear and two new AQC 13.8 kV – 4.16 kV two winding reserve auxiliary transformers (RATs) fed from the two spare breaker positions in the existing outdoor 13.8 kV switchgear described above. The new main and reserve auxiliary transformers will be sized such that one of the two transformers feeding the buses could be taken out of service, with the other transformer supplying the entire load. However, Unit 4 will require both AQC RATs to be in service

if the Unit 4 MAT is taken out of service. Also, Unit 3 in the final arrangement will use the Unit 4 scrubber and auxiliary systems. The power feeds will need to be switched over from Unit 4 to Unit 3 during conversion in order to maintain power to the scrubber system while Unit 4 is off-line. Further electrical studies (short-circuit, motor starting, etc.) will be performed during detailed design to determine the final transformer impedance and MVA ratings.

The recommended location of the two new AQC reserve auxiliary transformers that will be connected to the existing outdoor 13.8 kV switchgear will be in close proximity to the tie-in points on the east side of the units. The recommended locations of each of the four new AQC main auxiliary transformers will be in close proximity to each of their respective generator leads. Cable bus will be routed during detailed design from the secondary windings of these auxiliary transformers to the new AQC electrical buildings. The new electrical AQC buildings would be located in the vicinity of the PJFF or NID equipment as shown in the conceptual sketches in Appendix A. The buildings will contain the new medium voltage (MV) and low voltage (LV) switchgear, motor control centers (MCCs), and distributed control system (DCS) cabinets. A DC and UPS system will also be included in the electrical buildings to provide control power to the switchgear and DCS system. Motor control centers and DCS I/O cabinets may be installed in a small electrical building adjacent to remote AQC equipment to minimize cable lengths for the equipment in this area.

6.3 Water/Wastewater Systems Analysis

The Mill Creek water supply comes from three water sources: the Ohio River, Well Water, and City Water. The Ohio River supplies water to the Mill Creek station service water system. The service water system supplies cooling water for Unit 1, makeup water for Unit 2, 3, and 4 cooling towers, sluice water for the fly ash and bottom ash systems for all four units, and water to other miscellaneous users at the plant. Well water and city water supplies water to the cycle makeup treatment system which supplies demineralized water for makeup to the steam cycle and closed cycle cooling water systems, and other miscellaneous users for all four units. The Mill Creek wastewater system is made up of a number of ponds which eventually discharge to the Ohio River. Some of the wastewater is recycled for specific plants systems. The makeup water source for the existing WFGDs for Units 1, 2, 3 and 4 is from the Clearwell Pond. The Clearwell Pond collects water from Units 3 and 4 cooling tower blowdowns and receives a slightly greater amount of make-up water from the service water system. Wastewater from the existing WFGDs discharges to the Rim Ditch, which runs north along part of the Ash Pond. Suspended solids in the wastewater settle out in the ditch and are removed

and hauled to the landfill. From the Rim Ditch, the WFGD wastewater flows into the Ash Pond. Wastewater in these ponds discharges to the Ohio River through permitted discharge points.

The current water source for the WFGDs will be used for the upgraded, existing WFGDs, which include Unit 1 scrubber, Unit 2 scrubber and Unit 4 scrubber which will be functioning as the new Unit 3 scrubber. The new Unit 4 scrubber will also be supplied by the Clearwell Pond with the tie-in location to be determined during conceptual design. Upgrading the WFGDs and adding the new WFGD will result in changes of FGD makeup water quantity and wastewater discharge quality and quantity. However, these changes are minor and expected to be within the limits of the existing system and will be investigated further during conceptual design.

Additionally, if the NID option is selected, a source for NID makeup water will be required. Potential NID makeup water sources are FGD wastewater, water from the Clearwell Pond, service water, or the combination of the 3 water sources. The quality of water required for NID makeup water will be determined during conceptual design and the water quality of the potential sources will be evaluated. If the FGD wastewater is acceptable for NID makeup water, using the NID system will reduce the quantity of wastewater that flows to the pond system.

6.4 AQC Mass Balance Analysis

Upgrading the existing WFGD system for Mill Creek Units 1 and 2 will result in an increase in SO₂ removal efficiency from 92 to 96 percent. Upgrading the existing Unit 4 WFGD system and reusing it for Unit 3 will result in an increase in SO₂ removal efficiency from 86 to 96 percent. A new state of the art WFGD system on Unit 4 will result in an increase in SO₂ removal efficiency from 92 to 98 percent. The increase in the amount of SO₂ removed by WFGD system from the Mill Creek plants may potentially impact the reagent preparation and byproduct handling system.

Addition of NID or PJFF will increase the amount of ash removed from the Mill Creek units.

- **WFGD Byproduct Handling**--There will be a potential increase in the amount of byproduct produced by the WFGD because of the high amount of sulfur removal from the coal. Impact on existing byproduct handling system will be checked and verified during conceptual design. Is is estimated that there will be an approximately 5 percent increase in WFGD byproduct formation at Mill Creek Station

- **Ash Handling**--Additional new ash handling system will be required for NID or PJFF. Additional ash handling equipment may include but is not limited to pipes, blowers, valves, etc.

6.5 Reagent Impact/Cost Analysis

- **WFGD Reagent Preparation System**--There will be an approximately 5 percent increase in WFGD reagent requirements at Mill Creek Station. LG&E/KU are currently planning to add a third ball mill to process limestone into reagent. This increase in processing capacity is expected to be more than enough to allow the necessary increased production of reagent for the wet scrubbers.
- **Anhydrous Ammonia System**--There will be an increase in the amount of ammonia required if SCR systems are implemented on Unit 1 and Unit 2. Additional equipment required for anhydrous ammonia system may include but is not limited to ammonia storage tank, ammonia feed pumps, dilution air blowers, vaporizers, pipes, valves, instrumentation and control equipments etc. There will be approximately total of 530 lb/hr of more anhydrous ammonia required for Mill Creek Units 1 and 2.
- **NID Reagent Preparation System**--A new reagent (lime) handling and preparation system will be required for NID. Additional equipment required for reagent handling system for NID may include but is not limited to lime storage silo, lime day bins, air slides, blowers, pipes, valves, instrumentation and control equipments etc. There will be approximately total of 10,650 lb/hr of lime required for Mill Creek Station.
- **PAC Injection System**--A new PAC injection system will be required for mercury and dioxin/furan control. Additional equipment required for PAC injection system may include but is not limited to PAC storage silo, PAC injection lances, blowers, pipes, valves, instrumentation and control equipments etc. There will be approximately total of 3,800 lb/hr of PAC required for Mill Creek Station.
- **Trona/Lime/SBS Injection System**-- A new sorbent (trona/lime/SBS) injection system will be required for SO₃ control. Additional equipment required for sorbent injection system may include but is not limited to sorbent storage silo, injection lances, blowers, pipes, valves, instrumentation and control equipments etc. There will be approximately total of 6,620 lb/hr of sorbent (trona) required for Mill Creek Station.

6.6 Performance of Refurbished Existing Scrubbers

(Later: Pending third party evaluation.)

6.7 Chimney Analysis

Based on the recommendations made in Section 5.2, analysis of the chimneys at Mill Creek Station is based on the following scenarios:

- Unit 1 and Unit 2 – reuse the existing common chimney shell housing two independent flues.
- Unit 3 – use the existing Unit 4 chimney to discharge treated exhaust gases from Unit 3.
- Unit 4 – construct a new “wet” chimney to be located south of Unit 4 to discharge treated exhaust gases from Unit 4.

6.7.1 Unit 1 and Unit 2 Chimney

The existing Unit 1 / Unit 2 chimney consists of a common reinforced concrete shell supporting two independent and dedicated exhaust flues, one per unit, constructed of carbon steel lined with nickel alloy C-276 (UNS N10276). The flues extend to 600 feet above surrounding grade and the shell is penetrated by two breeching openings, one for the exhaust duct from each unit’s WFGD scrubbers.

The alloy flue liner is necessary due to the extremely corrosive conditions downstream of a wet flue gas scrubber. No physical inspection was completed as part of this study, but the alloy is an accepted and common liner material for this type of application and LG&E/KU have not indicated there is any reason to suspect problems with continuing to direct Unit 1 and Unit 2 exhaust gas the existing chimney.

The recommendations proposed in this study would result in negligible changes in the temperature, chemical aggressiveness, and total volume flow of the exhaust gases reaching the existing chimney. Moreover, no significant changes are proposed in the ductwork downstream of the existing wet scrubbers at Units 1 and 2, resulting in no expected change in the loads imposed on the chimney shell or the breeching penetrating the shell. Based on the above evaluation, it is recommended that the existing common Unit 1 / Unit 2 chimney be used as is when the respective AQC systems are upgraded.

It should be noted that chimney flue diameters and discharge elevations would remain unchanged. However, the affects of the new equipment will need to be included in the air permitting process.

6.7.2 Unit 3 Chimney

As part of the AQC upgrade recommended for Unit 3, exhaust from Unit 3 will be diverted to the existing Unit 4 wet scrubber and, via the existing exhaust ductwork from the scrubber, to the existing Unit 4 chimney. The existing Unit 3 chimney would be bypassed and abandoned in place. The Unit 4 chimney consists of a reinforced concrete shell supporting a single 19'-6" inside diameter exhaust flue constructed of carbon steel with a nickel alloy C-276 lining. The flue extends to 600 feet above surrounding grade and the shell is penetrated by a single breeching opening for the combined exhaust from both "trains" of the Unit 4 WFGD.

As with the Unit 1 / Unit 2 chimney, the alloy flue liner was provided to withstand the extremely corrosive conditions downstream of the wet scrubber. Alloy C-276 is an accepted and common liner material for the conditions expected in this application and, although no physical inspection was completed as part of this study, LG&E/KU have not indicated there is any reason to suspect problems with the condition of the existing chimney.

Because the Unit 4 chimney was designed for a unit larger than Unit 3, the inside diameter of the flue is larger than that in the to-be-abandoned Unit 3 chimney. The larger diameter flue will result in lower discharge velocities, assuming maximum Unit 3 flow remains relatively constant. The design expected exhaust gas flow reaching the Unit 4 chimney from Unit 3 is 1,347,348 ACFM. Based on the 19'-6" diameter of the flue, the average maximum velocity through the flue will be approximately 75 ft/sec.

The critical velocity for a liner material is a balance between sufficient velocity to ensure adequate dispersion as the gas is discharged from the top and a maximum velocity that prevents "stripping" of acidic condensate droplets from the liner surface and their carryover into the gas being discharged from the chimney. Relatively smooth liner surfaces like that of the alloy liner are less prone to being stripped of condensate by the gas stream than are rougher-surfaced brick and mortar liners. Thus higher velocities are normally allowed where smooth-surfaced liners are installed. There is no regulated or code-required range of velocities for exhaust gas in a chimney flue, but industry sources recommend the maximum gas velocity in a C-276 material-lined flue at 65 to 70 ft/sec. The calculated velocity of Unit 3 exhaust gas through the Unit 4 flue thus slightly exceeds the industry recommendations. However, this calculated velocity is less than that currently experienced through the existing smaller diameter Unit 3 chimney. Diverting the Unit 3 exhaust to the Unit 4 chimney would be expected to slightly lessen the potential of acid carryover, if any, from the Unit 3 chimney under current conditions.

The Unit 4 chimney should be fully acceptable as a discharge point for Unit 3 exhaust as recommended. Liner materials are appropriate for the conditions expected, maximum velocities are near optimum to prevent acid carryover, yet the exit velocity is only slightly reduced from that in the existing Unit 3 chimney. Due to changing the Unit 3 chimney to exhaust through the existing Unit 4 chimney, the affects of the new stack will need to be included in the air permitting process.

6.7.3 Unit 4 Chimney

Due to the recommended reuse of the existing Unit 4 chimney for Unit 3 and the prohibitive lengths of ductwork required to reuse any existing chimney, a new chimney will be required for Unit 4. The new chimney, similar to that of the other three units will be located downstream of a WFGD system and thus subject to extremely corrosive conditions. A “wet” chimney is required, usually consisting of a reinforced concrete shell protecting and supporting a chemically-resistant flue actually carrying the exhaust stream.

Several materials are suitable for use as a liner material in a wet chimney, each with their own advantages and disadvantages. Flues constructed of fire brick and acid-resistant mortar were the norm for many years. However, because of its relatively rough interior surface (increasing potential of carryover), high labor cost to construct, low seismic resistance, and high repair and maintenance record, brick and mortar flues are seldom specified any longer in the United States. Use of this type of flue for Mill Creek Unit 4 is not recommended.

Resin-lined carbon steel and borosilicate block-lined carbon steel are also suitable for the expected environment. However, the relatively low longevity and high repair costs of the resin liner make it a poor choice for a large chimney subject to constant operation. The borosilicate block (often known as Pennguard block after a primary manufacturer) is, similar to acid brick and mortar, relatively expensive to install and is somewhat brittle and susceptible to erosion and damage. For that reason, borosilicate block is used more often as a re-liner for existing chimneys than as the original liner material for a new chimney in the U.S. Neither resin nor borosilicate block liners are recommended for Mill Creek Unit 4.

The two liner materials used most often in the United States for large wet chimneys in that last 15 to 20 years are fiberglass-reinforced plastic (FRP) and C-276 alloy, either as a full-thickness flue material or as a cladding on carbon steel (known as “wallpapering”). The FRP liner material consists of fiberglass strands combined with a high temperature, flame retardant resin that is generally immune to the corrosive conditions in the flue gas. It has an excellent operating record in the U.S. and, usually

prefabricated in sections onsite, is relatively quick to install and less expensive than other materials. One significant concern with FRP is its flammability. The fire-retardant resins will burn under the right conditions, although a “FR” FRP liner material has been developed with additional chemicals mixed with the resins to improve the fire rating on the finished liner. Moreover, a fire upstream of FRP liners could cause serious over-temperature damage to the lining. A flue gas quench system is mandatory to protect the liner from high flue temperatures. Some owners do not specify FRP liners due to requirements by their insurance carriers because of fire and high heat concerns.

Alloy C-276 also has an excellent service record as a liner material over the last 20 years. It is highly resistant to the corrosive environment, has superior internal strength, is non-combustible, and is relatively easy to install. However, the nickel alloy material is expensive, and its price volatility over the last 10 years has been extreme, making it an uncertain choice on which to budget large construction projects. To minimize the material costs, a flue of solid C-276 material is often rejected in favor of a carbon steel flue with a thin lining of C-276 material welded to the interior. This “wallpapered” flue is still, depending on market conditions, usually more expensive than an FRP flue and is substantially more dependent on the quality of installation than a solid C-276 flue. Failures of the welds attaching the thin wallpaper to the carbon steel flue result in leaks and exposure of the underlying carbon steel to the corrosive environment in the chimney.

Both FRP and C-276 materials are relatively smooth and have similar critical velocities. Maximum industry-recommended critical velocity of exhaust flow through a C-276-lined flue is 70 ft/sec; for FRP, 65 ft/sec. For an estimated design exhaust flow of 1,885,224 acfm, the recommended flue diameter for a C-276 flue is 23.9 ft; for an FRP flue, 24.8 ft. Based on the existing Unit 4 chimney, a flue discharge height of 600 feet above grade is assumed acceptable.

Although all three chimneys existing at Mill Creek have flues lined with C-276 material, the expected lower cost of the FRP liner makes it the recommended choice, assuming Owner requirements do not dictate otherwise. The new chimney for Ghent Station Unit 4 contains an FRP liner and it is thus assumed LG&E/KU has no inherent objection to FRP liners. The estimate that will be completed during conceptual engineering will include the cost of a reinforced concrete chimney with a single 25-foot diameter FRP liner with a discharge elevation 600 feet above grade.

A new Unit 4 chimney will built be to support the new Unit 4 equipment. The affects of the new stack will need to be included in the air permitting process.

6.8 Constructability Analysis

“Brown-field” construction of major new equipment on an existing site often presents significant challenges in construction due to congestion, obstructions, and the need to keep existing units on line during construction. Accordingly, a high level constructability analysis was completed as part of this study in order to identify and evaluate potential concerns in the arrangements presented. A total of three general arrangement options were considered for Units 1 and 2, both NID and PJFF versions, and two general arrangement options for Units 3 and 4, both NID and PJFF versions. A total of ten arrangement conceptual sketches are attached to this study in Appendix A, each showing two of the units. Following are a generalized discussion of the sequence and concerns identified at the two pairs of units for the various arrangements considered.

6.8.1 Unit 1 Arrangement

As part of Phase I of the project, the major equipment was proposed to be located in the “alley” between Unit 1 and Unit 3. This arrangement for Unit 1 was investigated further and is detailed on Unit 1 / Unit 2 NID Arrangement Sketch A and Unit 1 / Unit 2 PJFF Arrangement Sketch A, attached. This arrangement, as can be seen in the sketches, is extremely congested and would be difficult to erect. The lack of available space prevents inclusion of a replacement ESP at Unit 1 and requires construction of the NID/PJFF to be elevated to clear the scrubber vessel, as well as require construction above the existing reserve aux transformers. Moreover, the location of the NID/PJFF cuts off access for materials and construction for the new Unit 1 SCR and access for a crane to maintain the new SCR. From an operations standpoint, access to Unit 1, the existing Administration Building, and the existing Unit RATs from the east would be lost or seriously restricted. Installation of new Unit RATs in a different location may be necessary.

Due to problems presented with the Sketch A arrangement, a second potential arrangement for Unit 1 was investigated. Unit 1 / Unit 2 NID Arrangement Sketch B and Unit 1 / Unit 2 PJFF Arrangement Sketch B detail the second Unit 1 arrangement considered. The NID/PJFF is located on a new superstructure installed spanning the existing SDRS Service Building. New ID fans are located downstream of the NID/PJFF and gas flow is then reestablished into the existing scrubber inlets and thence out the existing chimney. The lack of available space for this arrangement also precludes installation of a replacement ESP for Unit 1. A substantial new foundation and superstructure must be constructed to span the SDRS Building (and adjoining road for the NID option), but access to the Unit 1 powerblock and construction access for the new SCR is maintained.

Should a new replacement ESP be mandatory for Unit 1, a third arrangement was considered as detailed on Unit 1 / Unit 2 NID Arrangement Sketch C and Unit 1 / Unit 2 PJFF Arrangement Sketch C. New construction for both Units 1 and 2 would be located north of the Unit 2 scrubber area east of the Water Treatment Building. This arrangement has the advantage of being relatively crane accessible and, to a great extent, more accessible for construction. However, the ductwork required for Unit 1 in this arrangement is extreme, with the resultant expense, complexity of foundations and support structures, and increased elevation of the ductwork to avoid restricting access to existing facilities. Due to Unit 2 construction being located in the same area, the new ESP/PJFF would have to be constructed on top of the new ESP, increasing the elevation of the installation as well as the complexity of construction.

All three Unit 1 arrangements considered include a new SCR located in place of the existing ESP, requiring the ESP to be demolished. To minimize unit outage, the NID/PJFF and replacement ESP, where one is planned, must be installed first and tied into the system before demolition of the existing ESP can begin. In all three arrangements, both sets of existing ID and booster fans are bypassed and the new ID fans provide the motive force for the gas flow through the system.

Although the three arrangements considered differ in detail, the same general sequence of construction applies to each. The expected sequence of construction (and estimated timeframe) for installation for the three Unit 1 arrangements is as follows and as noted:

- Construct new foundations and any supporting superstructure for the NID/PJFF and ductwork up to tie-in points. This would also include installing major portions of the new ESP for Arrangement C (8 months, non-outage).
- Install new NID/PJFF and ancillary systems, plus ductwork to tie-in points. Complete installation of new ESP for Arrangement C (*24 months, non-outage*).
- Demo existing ESP (*8 weeks, outage*).
- Install by-pass toggle ductwork to air heater (*8 weeks, concurrent with ESP demo outage*).
- Complete tie-in of ductwork to new fans and existing scrubber (*8 weeks, concurrent with ESP demo outage*).
- Start-up new NID/PJFF system (and ESP for Arrangement C) (*10 weeks*).
- Construct new SCR (*18 months, non-outage*).
- Tie-in SCR (*8 weeks, outage*).

- Start-up new SCR (*10 weeks*).
- Existing Scrubber refurbishment is to be completed ahead of time during regular plant maintenance outages.

Demolition of the existing ESP and construction of a new SCR in its place will require cranes with substantial reach, especially for Arrangement A. Open areas were left in Arrangements B and C to allow placement of cranes south of the Unit 1 scrubber and between the existing Unit RATs and the boiler building for work at Unit 1. All three arrangements require the NID/PJFF to be installed above other new or existing equipment, resulting in substantial work at heights and the resulting complications and inefficiencies. Installation of foundations will be problematic due to the existing congestion (somewhat less for Arrangement C) and the need to maintain unit operation to the extent practical. Micropiles may be required for many of the foundations in the interior area near the chimney. In addition, the following issues will have to be addressed in detail to support construction at Unit 1.

- Above and below ground utility interferences and relocations may be necessary.
- Ground and soil stability for setting cranes and heavy haul traffic must be confirmed.
- The potential and magnitude of existing equipment relocations needed to support access, crane setting, construction traffic flow, construction operations activities, and placement of new AQC equipment and ancillary equipment must be investigated.
- Conflicts with existing plant operations must be evaluated and minimized. Isolation of the work area from operating areas must be considered if practical, while still allowing maintenance access to existing equipment.
- Existing plant traffic patterns will be interrupted and must be rerouted. Existing roads must be reestablished or possibly modified upon completion of construction.
- Demolition will be selective dismantling operations in order to work around existing equipment and ancillaries.
- For Arrangement C, the existing overhead Unit 1 and Unit 2 transmission line north of Unit 2 must be relocated.
- Elevating the NID/PJFF and ductwork above the new or existing equipment or structures will require a substantial new foundation and superstructure.

- Relatively extensive new work and rework will be required within the envelope of the existing boiler and ESP structures, requiring extensive evaluation of the existing structure and careful implementation of new work.

6.8.2 Unit 2 Arrangement

In all three alternate arrangements considered for Unit 2, the major portion of new construction is located to the north of the existing Unit 2 scrubber area and east of the existing Water Treatment Building. Phase I of the project proposed the ESP and NID/PJFF be stacked in this area, as detailed on Unit 1 / Unit 2 NID Arrangement Sketch A and Unit 1 / Unit 2 PJFF Arrangement Sketch A, attached. This arrangement makes good use of available space, but requires substantial portions of the work to be elevated, with the resulting complications to construction and access.

A second potential arrangement for Unit 2 allowing more construction at grade was investigated. Unit 1 / Unit 2 NID Arrangement Sketch B and Unit 1 / Unit 2 PJFF Arrangement Sketch B detail the second Unit 2 arrangement considered. The NID/PJFF is located separate from and downstream of the new ESP. New ID fans are located downstream of the NID/PJFF and gas flow is then reestablished into the existing scrubber inlets and thence out the existing chimney. The larger footprint required results in some construction extending over the sharp slope northeast of Unit 2, requiring substantial fill work and establishment of a new plant road system in the area.

A third arrangement was dictated by the location of Unit 1 construction in the same area as detailed on Unit 1 / Unit 2 NID Arrangement Sketch C and Unit 1 / Unit 2 PJFF Arrangement Sketch C. This arrangement for Unit 2 is essentially the same as Arrangement A with the added complexity of routing duct through to Unit 1. This arrangement requires both the additional elevation and construction complexity of Arrangement A and the added fill work of Arrangement B. But it does have the advantage of being relatively crane accessible and, to a great extent, more accessible for construction.

As with Unit 1, all three Unit 2 arrangements include a new SCR located in place of the existing ESP, requiring the ESP to be demolished. To minimize unit outage, the NID/PJFF and replacement ESP must be installed first and tied into the system before demolition of the existing ESP can begin. In all three arrangements, both sets of existing ID and booster fans at Unit 2 are bypassed and the new fans provide the motive force for the gas flow through the system.

Although the three arrangements considered differ in detail, the same general sequence of construction applies to each. The expected sequence of construction (and

estimated timeframe) for installation for the three Unit 2 arrangements is as follows and as noted:

- Construct new ESP and NID/PJFF with ductwork up to tie-in points at air heater and refurbished existing scrubber, plus ancillary systems required for operation (*24 months, non-outage*).
- Demo existing ESP (*8 weeks, outage*).
- Install tie-ins to air heater and scrubber (*8 weeks, concurrent with ESP demo outage*).
- Start-up new ESP and NID (*10 weeks*).
- Construct new SCR (18 months, non-outage).
- Tie-in new SCR (*8 weeks, outage*).
- Start-up new SCR (*10 weeks*).
- Existing scrubber refurbishment is to be accomplished ahead of time during plant maintenance outages.

An open area was left in the arrangement to allow placement of a large crane east of the Water Treatment Building for work at Unit 2. As at Unit 1, installation of foundations will be problematic due to the existing congestion and the continued operation of existing equipment. Micropiles may be required in congested areas, although the major construction area north of the Unit 2 scrubber appears relatively clear. In addition, the following issues will have to be addressed in detail to support construction at Unit 2.

- Above and below ground utility interferences and relocations may be necessary.
- Ground and soil stability for setting cranes and heavy haul traffic must be confirmed.
- A significant grade elevation change exists at northeast corner of the proposed area, which may require additional fill or may complicate access.
- The existing Water Treatment Building and an adjacent pipe rack will complicate crane access to Unit 2.
- The path to the existing warehouse receiving dock lies directly in the main construction area, requiring its early relocation to minimize impact on operations.
- Other conflicts with existing plant operations must be evaluated and minimized. Isolation of the work area from operating areas must be considered if practical, while still allowing maintenance access to existing equipment.

- Existing plant traffic patterns will be interrupted and must be rerouted. Existing roads must be reestablished or possibly modified upon completion on construction.
- Demolition will be selective dismantling operations in order to work around existing equipment and ancillaries.
- The existing overhead Unit 1 and Unit 2 transmission line located north of Unit 2 must be relocated.
- Relatively extensive new work and rework will be required within the envelope of the existing boiler and ESP structures, requiring extensive evaluation of the existing structure and careful implementation of new work.

6.8.3 Units 3 and 4 Arrangement

The modifications proposed at Units 3 and 4 are interdependent in that the Unit 4 scrubber and chimney will be reused in the modified Unit 3. Accordingly construction of these two units will be considered together. Unit 4 will be the first of the two units to be modified and will be addressed first. Since the Unit 4 scrubber and chimney will be dedicated to Unit 3, a new wet scrubber and chimney will be constructed downstream of the NID/PJFF, with the addition of booster fans to supplement the existing Unit 4 ID fans. Ductwork feeding the downstream Unit 4 AQC train will be located in the area currently occupied by Unit 4 duct to the scrubber and bypass duct to the chimney.

Phase I work identified a location for the new Unit 4 construction in the area of the existing foundation for the demolished thickener south of the Reagent Prep building. This arrangement, as detailed on Unit 3 / Unit 4 NID Arrangement Sketch A and Unit 3 / Unit 4 PJFF Arrangement Sketch A, allows construction access from the main plant road and relatively easy operational access to the equipment. However, ductwork lengths are significant for this arrangement, plus ductwork must be routed above the existing limestone conveyor and ash pipe rack. In addition, the thickener foundation must be demolished and the existing ammonia storage area relocated. An overhead T-line is routed directly through the area and would also likely have to be relocated to allow safe construction. Finally, the relatively close location of the Unit 4 cooling tower may cause icing problems on the new AQC equipment and this would have to be considered.

An alternate arrangement was then investigated for Unit 4 as detailed on Unit 3 / Unit 4 NID Arrangement Sketch B and Unit 3 / Unit 4 PJFF Arrangement Sketch B, attached. Instead of continuing to the south, the AQC train is turned along an east-west axis south of Unit 4, with new equipment located between the limestone storage area and Unit 4. The NID/PJFF will be elevated and located above the existing Unit 4 AQC

Switchgear Building, whose contents will be modified for reuse on Unit 3. Ash handling equipment and new electrical equipment for Unit 4 will be located in the remaining area under the NID/PJFF. This arrangement will require the existing Annex Building, Sample Lab, and old Aux Boiler Building to be demolished or relocated. This arrangement is also somewhat more congested than the Sketch A arrangement and equipment arrangement must be carefully coordinated to maintain access to the Unit 4 Boiler and Turbine Buildings and minimize impact to the limestone storage pile.

Construction of Unit 3 will be completed in two parts to minimize outages. Once Unit 4 modifications are complete and the unit is on line, new ductwork will be extended from the existing Unit 3 ID fans to the Unit 4 scrubber inlets. The new duct will be routed beneath the Unit 4 duct, turn, and rise at a diagonal to the existing scrubber inlet duct. Unit 3 will then be put back into operation using the Unit 4 scrubber and chimney. The existing Unit 3 scrubber, now bypassed, will then be demolished and the area cleared for a new NID/PJFF and two additional booster fans, plus tie-in ductwork. Once new construction is complete, tie-ins will be made to bring the new NID/PJFF into service. The NID/PJFF will be elevated to span across the existing road and allow ash handling equipment to be located beneath in the footprint of the demolished Unit 3 scrubber.

The expected sequence of construction (and estimated timeframe) for installation for the Unit 3 and Unit 4 construction is as follows:

- Demo and/or relocate existing structures in the way of new construction (duration to be determined based on arrangement selected, non-outage).
- Construct Unit 4 AQC Train, starting at the new chimney and proceeding upstream (*36 months, non-outage*).
- Tie-in Unit 4 to new AQC Train (*8 weeks, outage*).
- Start-up Unit 4 (*12 weeks*).
- Recondition Existing Unit 4 Scrubber for use by Unit 3 and switch power source for “old” Unit 4 AQC to Unit 3 (*TBD - by others, non-outage*).
- Install new duct from Unit 4 scrubber inlet to tie-in points at Unit 3 ID fans (*8 weeks, concurrent with scrubber reconditioning*).
- Tie-in Unit 3 to reconditioned Unit 4 scrubber (*8 weeks, outage*).
- Start-up Unit 3 (*8 weeks*).
- Demo Unit 3 Scrubber and all areas needed to facilitate new NID/PJFF and all ancillary equipment (*6 weeks, non-outage*).
- Reclaim area demolished and make ready for NID/PJFF construction (*12 weeks, non-outage*).

- Erect Unit 3 NID/PJFF (*16 months, non-outage*).
- Make final tie-in to Unit 3 NID/PJFF (*6 weeks, outage*).
- Start-up Unit 3 (*10 weeks*).

Crane access for construction of Unit 3 and Unit 4 appears relatively good for either arrangement, although access for both units in Arrangement B will be limited to a great extent to one side. Extensive coordination of the installation of new ductwork in the area between the existing ID fans and the existing scrubbers will be required to minimize outage. Demolition of the existing Unit 3 scrubber, especially the foundation and underground portion, will be extensive and consideration should be given to abandoning and backfilling the existing substructure to the extent practical. Reuse of existing ductwork support steel and foundations should also be considered as practical. Access for piling appears acceptable except under existing ductwork, where micropiles may be required. In addition, the following issues will have to be addressed in detail to support construction at Units 3 and 4.

- Traffic patterns for north/south road must be adjusted to accommodate construction traffic and cranes, primarily for Unit 3.
- The existing thickener foundation, overhead Unit 3 and unit 4 transmission line, and Ammonia Storage Building (Arrangement A) or Annex Building, Sample Lab, and old Aux Boiler Building (Arrangement B) must be demolished or relocated.
- Above and below ground utility interferences and relocations may be necessary.
- Ground and soil stability for setting cranes and heavy haul traffic must be confirmed.
- A retaining wall, either temporary or permanent, will likely be required at the north side of the limestone pile to maximize construction access along the south side of Unit 4 (Arrangement B only).
- Conflicts with existing plant operations must be evaluated and minimized. Isolation of the work area from operating areas must be considered if practical, while still allowing maintenance access to existing equipment.
- Demolition will be selective dismantling operations in order to work around existing equipment and ancillaries.
- The condition of existing ductwork support steel must be evaluated if it can be reused for new ductwork.
- Ductwork and ancillary layout will be extensive and must take existing operating units into consideration.

- Maintain operating access to Unit 4 Turbine Building.
- Maintain operating access to Unit 4 Boiler Building.

6.9 Truck/Rail Traffic Analysis

The modifications proposed for the four Mill Creek units will result in additional bulk material required to support the AQC processes. These materials will be delivered from offsite on a regular basis and stored onsite for use. Preliminary estimates of the rate of use of sorbents or reagents required in the proposed AQC processes by unit are listed in Table 6-9. Additional delivery traffic for the site as a whole will be addressed accordingly.

Table 6-9. Sorbents and Reagents Consumption Rates (tph)					
Material	Unit 1	Unit 2	Unit 3	Unit 4	Station Total
PAC	0.39	0.41	0.49	0.60	1.89
Sorbent (Trona) (Note 1)	0.96	0.99	1.26	1.53	4.74
Pebble or powdered lime (Note 1)	1.48	1.55	2.01	2.47	7.51
Anhydrous ammonia	0.132	0.133	Note 2	Note 2	0.265 addn'l
tph - tons per hour.					
Notes:					
1. Sorbent (Trona) is not required if the NID particulate removal technology is specified. Lime is not required if the PJFF technology is specified.					
2. Current rate of consumption of anhydrous ammonia at Units 3 and 4 will remain essentially unchanged.					

Although a rail spur and delivery loop exist at Mill Creek Station, the onsite rail system is used exclusively for coal deliveries. Due to the variable schedules in coal train arrival and the relatively extended periods required to unload a unit train, using the existing rail system for periodic delivery of other bulk materials would be problematic at best. Similarly, limestone is delivered to the site via a dedicated barge unloading system that would be difficult to coordinate with delivery of other materials. Accordingly, delivery of bulk sorbents and reagents for the proposed AQC systems, other than limestone, will be assumed to be via truck on existing roads.

Dry bulk material, such as PAC, sorbent (trona), and pebble or powdered lime, is normally delivered in fully-enclosed bulk delivery trucks and offloaded using a pneumatic transfer system integral to the truck. A standard over-the-road trailer truck size for these materials is nominally 20 tons per load. Anhydrous ammonia is usually transported in a pressurized tank truck with a nominal capacity of 10,000 gallons. Based on the consumption rates in the Table 6-9 above and the nominal truck sizes, the additional truck deliveries to the Mill Creek site can be summarized as follows.

- PAC 16 loads per week
- Sorbent (Trona) 40 loads per week (PJFF only)
- Lime 63 loads per week (NID only)
- Anhydrous ammonia 2 loads per week additional

Noting that sorbent (trona) and lime deliveries are mutually exclusive depending on the particulate removal technology used, the total additional truck deliveries estimated to provide sorbents or reagents is approximately 58 loads per week for PJFF and 81 loads per week for NID. Assuming delivery operations are limited to five days a week and an 8-hour day, the maximum additional truck deliveries to site would be approximately 16 per day or 2 per hour over and above the current deliveries being made. Existing roads onsite should be able to accommodate the additional deliveries. A tank or silo is often provided for each material at each unit to minimize the size and length of distribution systems. However, where practical, consideration should be given to consolidated tanks or silos located so as to serve more than one unit, in order to minimize unloading time and extended truck travel onsite.

The upgrading of the existing FGD scrubbers will increase consumption of limestone reagent as well as produce additional gypsum byproduct. On a station-wide basis, approximately 5 percent additional limestone will be required for the desulphurization process, or an estimated total of 83 tph. Since all limestone is currently delivered via barge and offloaded into the limestone pile and reagent preparation building via dedicated conveyor, both deliveries and the unloading process will require an increase of approximately 5 percent over current operating rate or operating time to maintain needed supply to the process. LG&E/KU are currently planning to add a third ball mill to process limestone into reagent. This one third increase in processing capacity is expected to be more than enough to allow the necessary increased production of reagent for the wet scrubbers.

Gypsum production from the four units will also increase approximately 5 percent above current production, or an estimated 153 tph (wet basis) station-wide. This material is transferred to the dewatering/ash handling area for disposal. It is believed that the existing transfer system is adequate for the incremental increase in gypsum production.

The added particulate removal system at each unit, whether ultimately a NID or a PJFF, will capture additional particulate that will need to be landfilled. The PAC and trona (PJFF) or PAC and lime (NID) injected into the system upstream will ultimately be removed by the particulate removal equipment. In addition, more fly ash will be removed by the new PJFF or NID at Units 3 and 4 than is currently collected in the ESPs. The total expected additional particulate, including additional fly ash as well as the injected material, removed from the exhaust streams of the four units is estimated at 18,920 lb/hr, worst case, or approximately 227 tons per day of operation of all four units. This increased volume will require additional operating time for the existing (and augmented) ash transfer systems to deliver the ash to the ash handling area. Current ash disposal activities will have to increase accordingly.

7.0 Conclusion

This Air Quality Control Validation Report confirms the feasibility of installing certain AQC equipment at Mill Creek Station and presents the supporting considerations, arrangements, and preliminary validating analyses of the AQC equipment that will be built upon in the next steps of the project to complete the conceptual design and budgetary cost estimate.

After review of the presented information and further discussions, LG&E/KU has directed B&V to proceed to the conceptual design and budgetary cost estimate steps based on the following arrangements.

Unit 1 shall include a new SCR, new sorbent injection system, new PAC injection system, new PJFF, new ID fans, refurbished scrubber and will utilize the existing common Unit 1/Unit 2 chimney. The project will include demolition of the existing CS-ESP as required for installation of the new SCR and shall not include installation of a new CS-ESP. A neural network shall also be included. Unit 1 PJFF Arrangement B with the new SCR located in the area currently occupied by the existing CS-ESP and with the new PJFF located above the existing Unit 1 and Unit 2 SDRS pump/electrical building is to be utilized. Cost associated with installation of the SCR shall be easily identifiable and separated for further consideration based on final regulations.

Unit 2 shall include a new SCR, new sorbent injection system, new PAC injection system, new PJFF, new ID fans, refurbished scrubber and will utilize the existing common Unit 1/Unit 2 chimney. The project will include demolition of the existing CS-ESP as required for installation of the new SCR and shall not include installation of a new CS-ESP. A neural network shall also be included. Unit 2 PJFF Arrangement C with the new SCR located in the area currently occupied by the existing CS-ESP and with the new PJFF located to the North of existing Unit 2 is to be utilized excluding the installation of a new CS-ESP. Cost associated with installation of the SCR shall be easily identifiable and separated for further consideration based on final regulations.

B&V developed Arrangement D to show the combination of Arrangements B and C for Units 1 and 2. Refer to Appendix A for Arrangement D.

Unit 3 shall include the existing SCR, existing CS-ESP, existing ID fans, new sorbent injection system, new PAC injection system, new PJFF, new booster fans. Also included will be the refurbishment of the existing Unit 4 scrubber for use on Unit 3 and will utilize the existing Unit 4 chimney. The project will include demolition of the existing Unit 3 scrubber as required for installation of the new PJFF. A neural network shall also be included. Unit 3 PJFF Arrangement A/B with the new PJFF located in the area currently

occupied by the existing Unit 3 scrubber with ductwork extended to the existing Unit 4 scrubber is to be utilized.

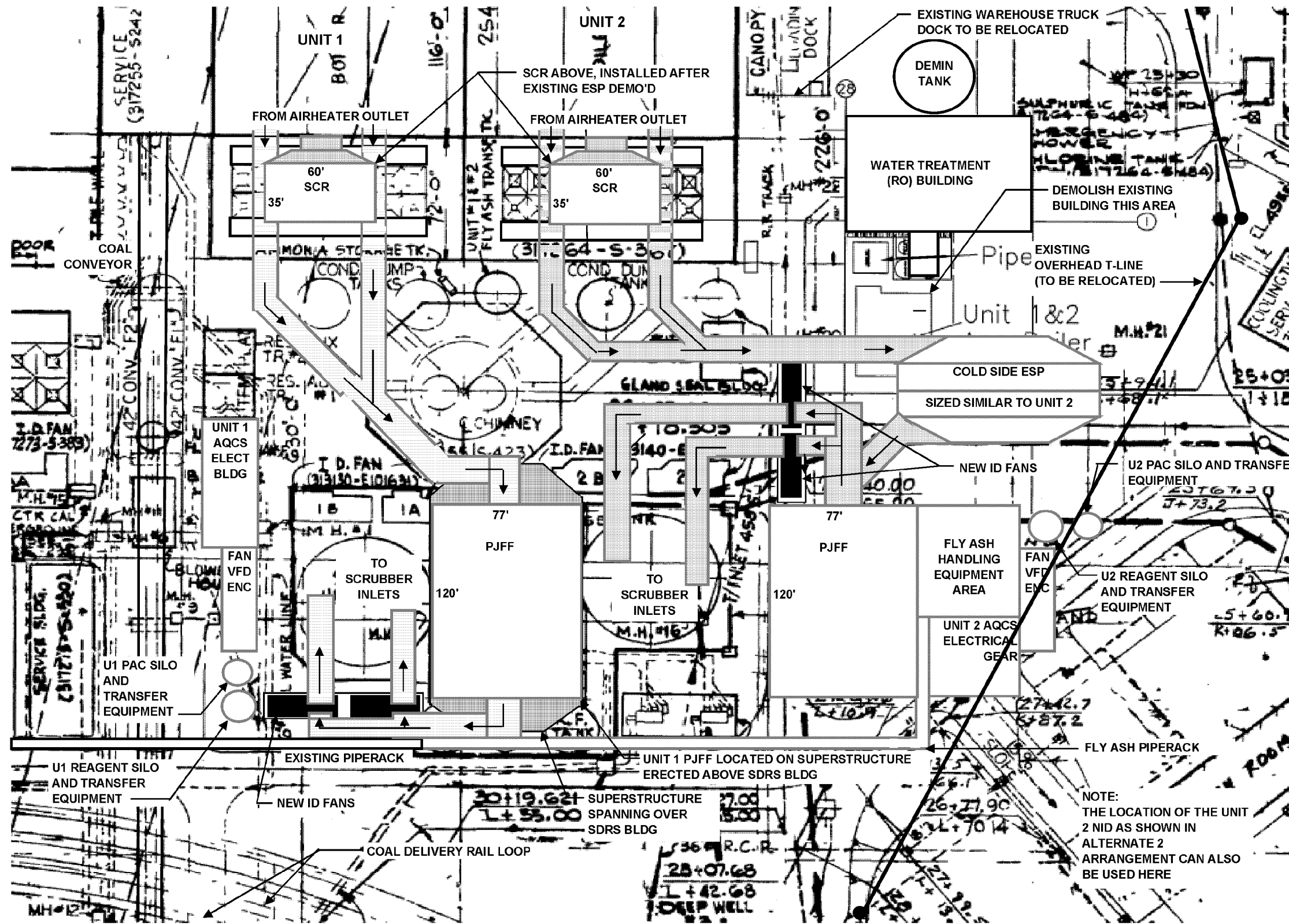
Unit 4 shall include the existing SCR, existing CS-ESP, existing ID fans, new sorbent injection system, new PAC injection system, new PJFF, new booster fans, new WFGD, and new chimney. A neural network shall also be included. Both arrangements are to be included in the conceptual design and budgetary cost estimate steps: Unit 4 PJFF Arrangement A oriented north-south and Unit 4 PJFF Arrangement B oriented east-west.

Additionally, the following items shall also be considered in the next step of the project.

- Relocation of the overhead transmission lines that serve Units 1 and 2 on the north end of the plant and that serve Units 3 and 4 on the south end of the plant should be avoided if possible. Weekend outages of the lines are possible if scheduled in advance. Lines can not be relocated underground.
- For Unit 4 Arrangement A, demolition and removal of the entire thickener foundation and tunnels may not be necessary.
- Unit 4 Arrangement B shall include provision for access and lifting means for replacement of conveyor belts on the tripper floor.
- Replacement of the existing Unit 4 scrubber to chimney ductwork is required due to corrosion and should be accounted for in this project.
- Isolation dampers shall be provided on all new fans.
- Unit 4 Arrangement B should consider locating the slurry storage tank inside the chimney shell below the liner to increase access.
- Unit 4 Arrangement B should included extension of the south FD fan monorail and modifications to the SCR tower.
- Locations for the relocation of Unit 3/4 ammonia storage system, annex building, laboratory and old unit 4 aux boiler building/warehouse to be recommended by LG&E/KU.

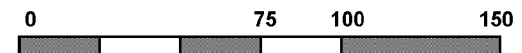
**Appendix A
Conceptual Sketches**

**Unit 1 and 2
Pulse Jet Fabric Filter Alternatives (A, B, C, and D)**

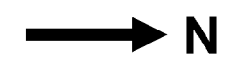


**UNIT 1 / UNIT 2
PJFF ARRANGEMENT B
CONCEPTUAL SKETCH
USING ESP, PJFF, SCR &
NEW ID FANS AT UNIT 2,
AND PJFF & SCR AT
UNIT 1, NO NEW ESP**

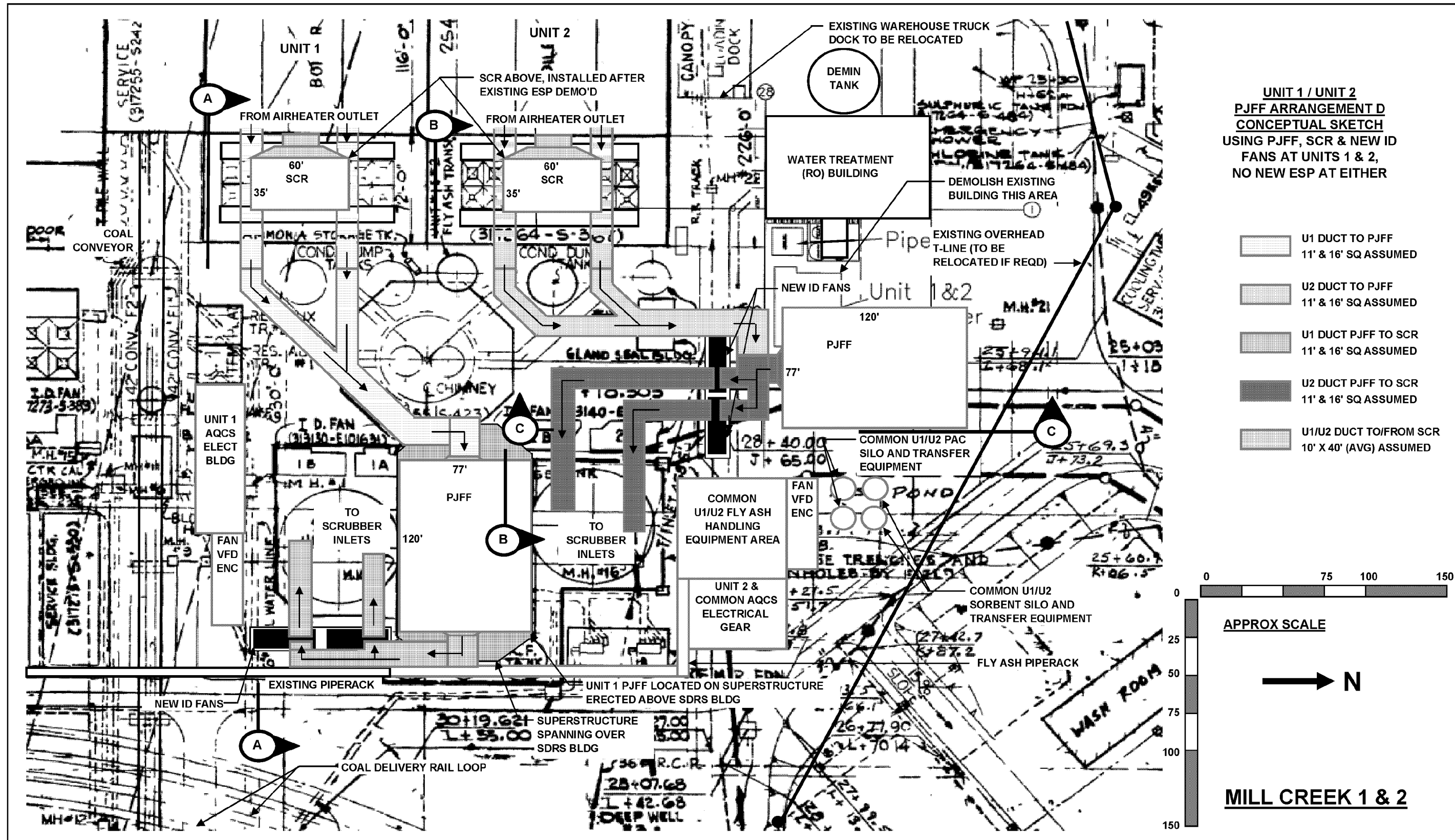
- U2 DUCT TO ESP & NID
11' & 16' SQ ASSUMED
- U1 DUCT TO NID
11' & 16' SQ ASSUMED
- U1/U2 DUCT TO/FROM SCR
10' X 40' (AVG) ASSUMED



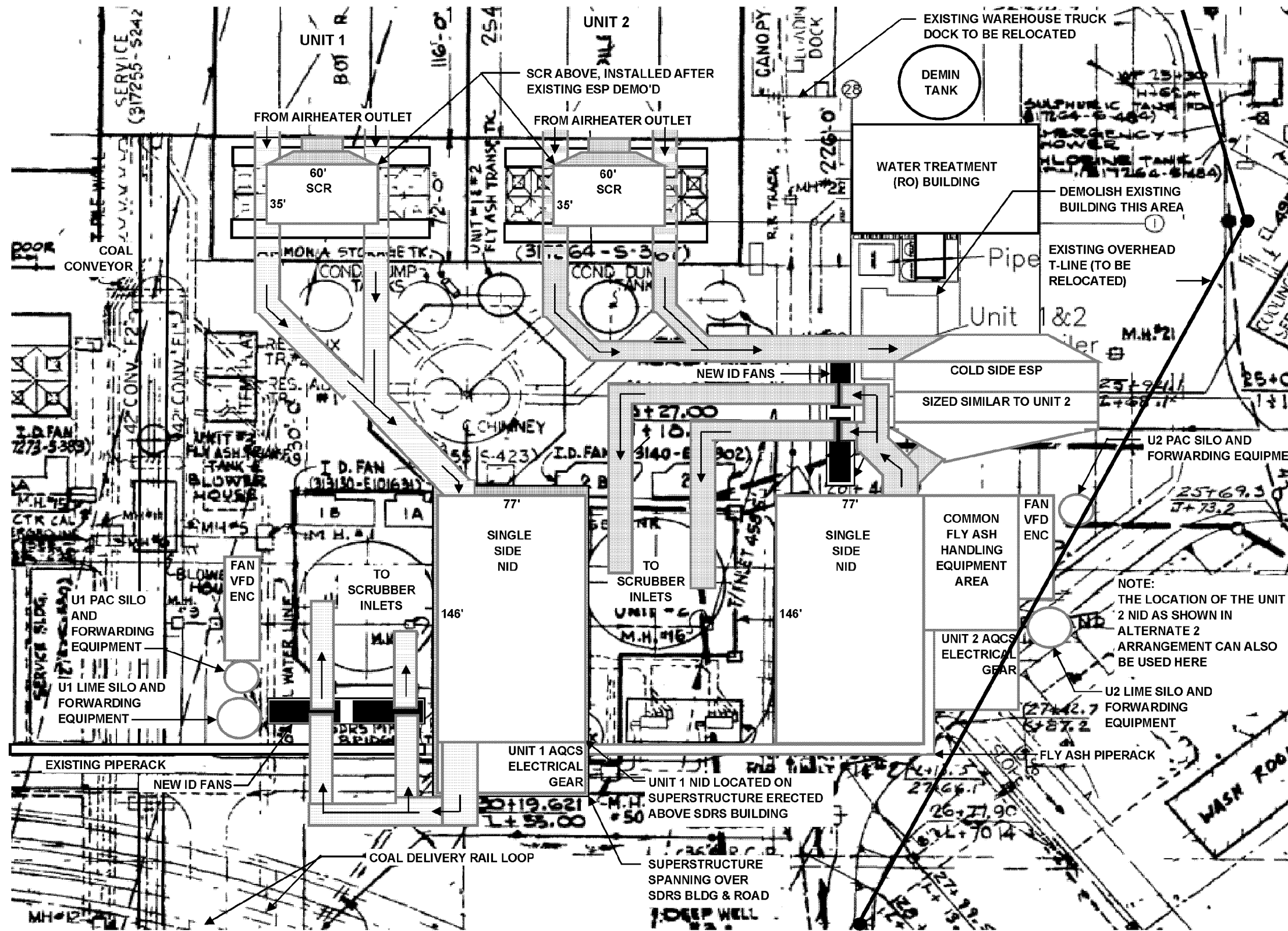
APPROX SCALE



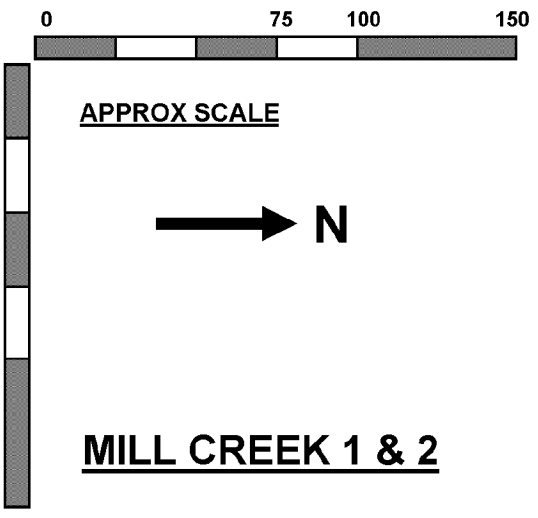
MILL CREEK 1 & 2

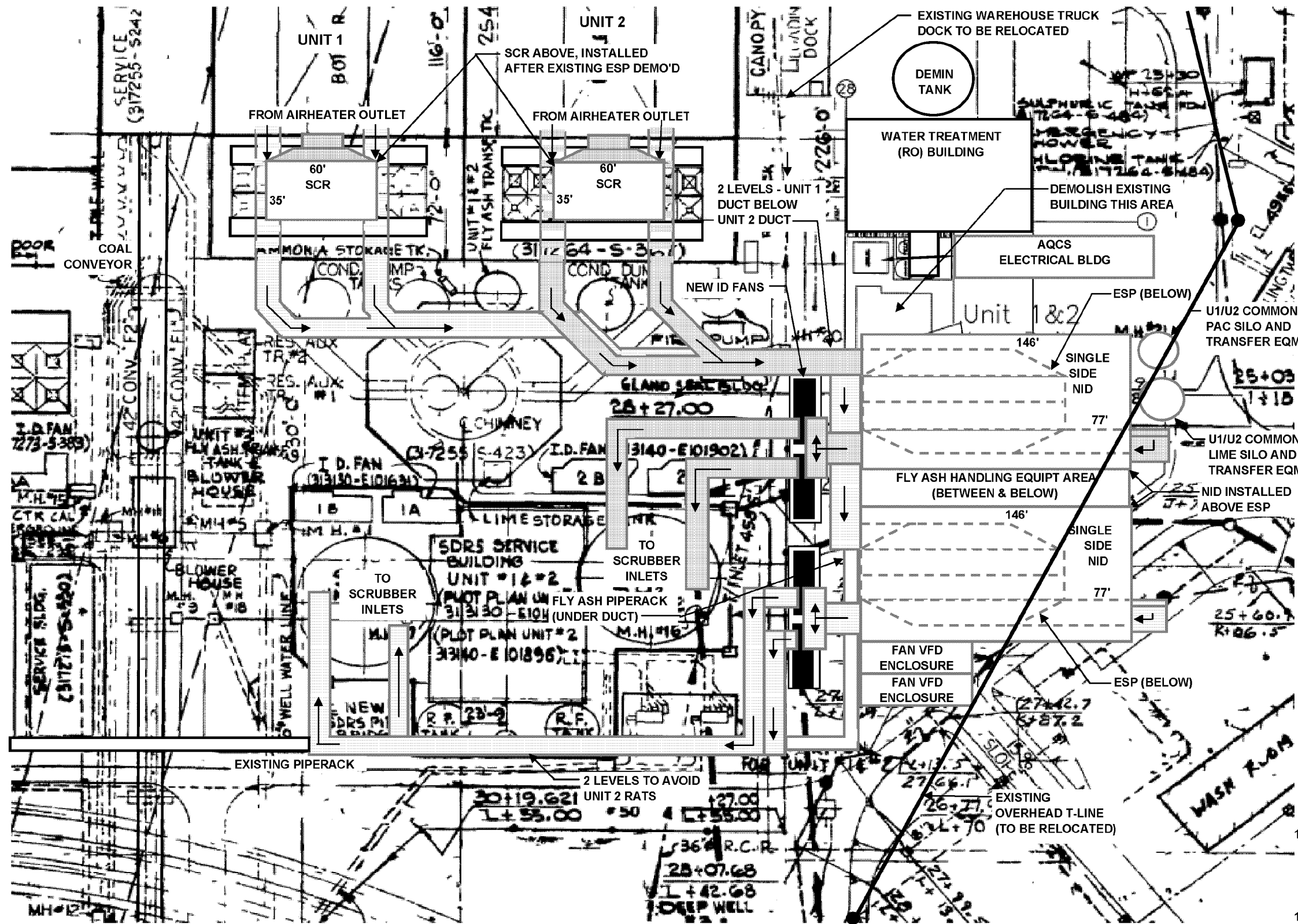


**Unit 1 and 2
Novel Innovative Desulfurization System Alternatives
(A, B, and C)**



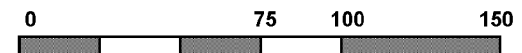
- UNIT 1 / UNIT 2
NID ARRANGEMENT B
CONCEPTUAL SKETCH
USING ESP, NID, SCR &
NEW ID FANS AT UNIT 2,
AND NID & SCR AT
UNIT 1, NO NEW ESP**
- U2 DUCT TO ESP & NID
11' & 16' SQ ASSUMED
 - U1 DUCT TO NID
11' & 16' SQ ASSUMED
 - U1/U2 DUCT TO/FROM SCR
10' X 40' (AVG) ASSUMED



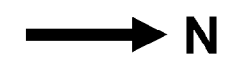


**UNIT 1 / UNIT 2
NID ARRANGEMENT C
CONCEPTUAL SKETCH
NEW NID, SCR, ESP, AND
ID FANS AT UNITS 1 & 2**

- U2 DUCT TO ESP & NID
11' x 16' SQ ASSUMED
- U1 DUCT TO NID
11' x 16' SQ ASSUMED
- U1/U2 DUCT TO/FROM SCR
10' x 40' (AVG) ASSUMED

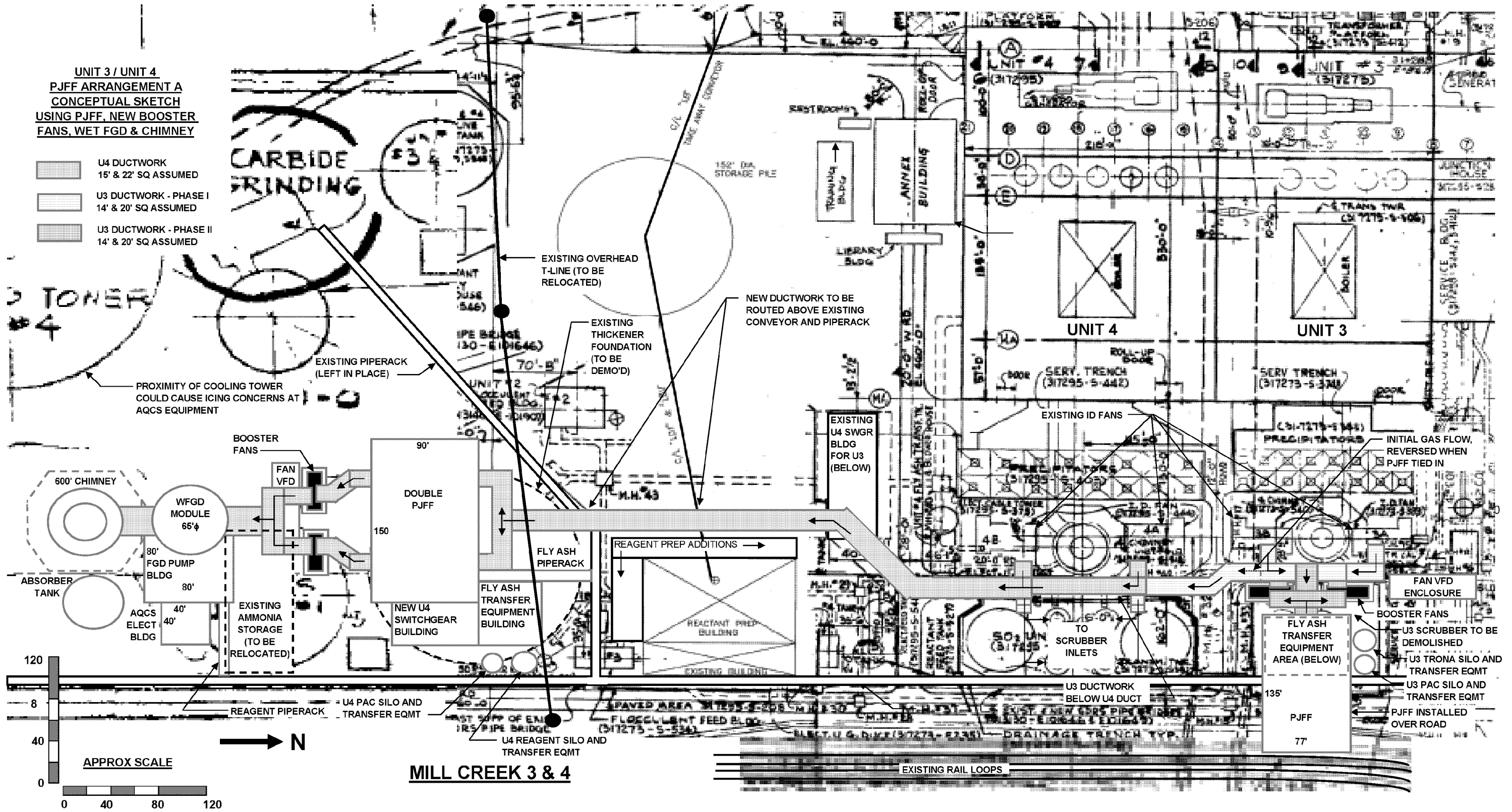


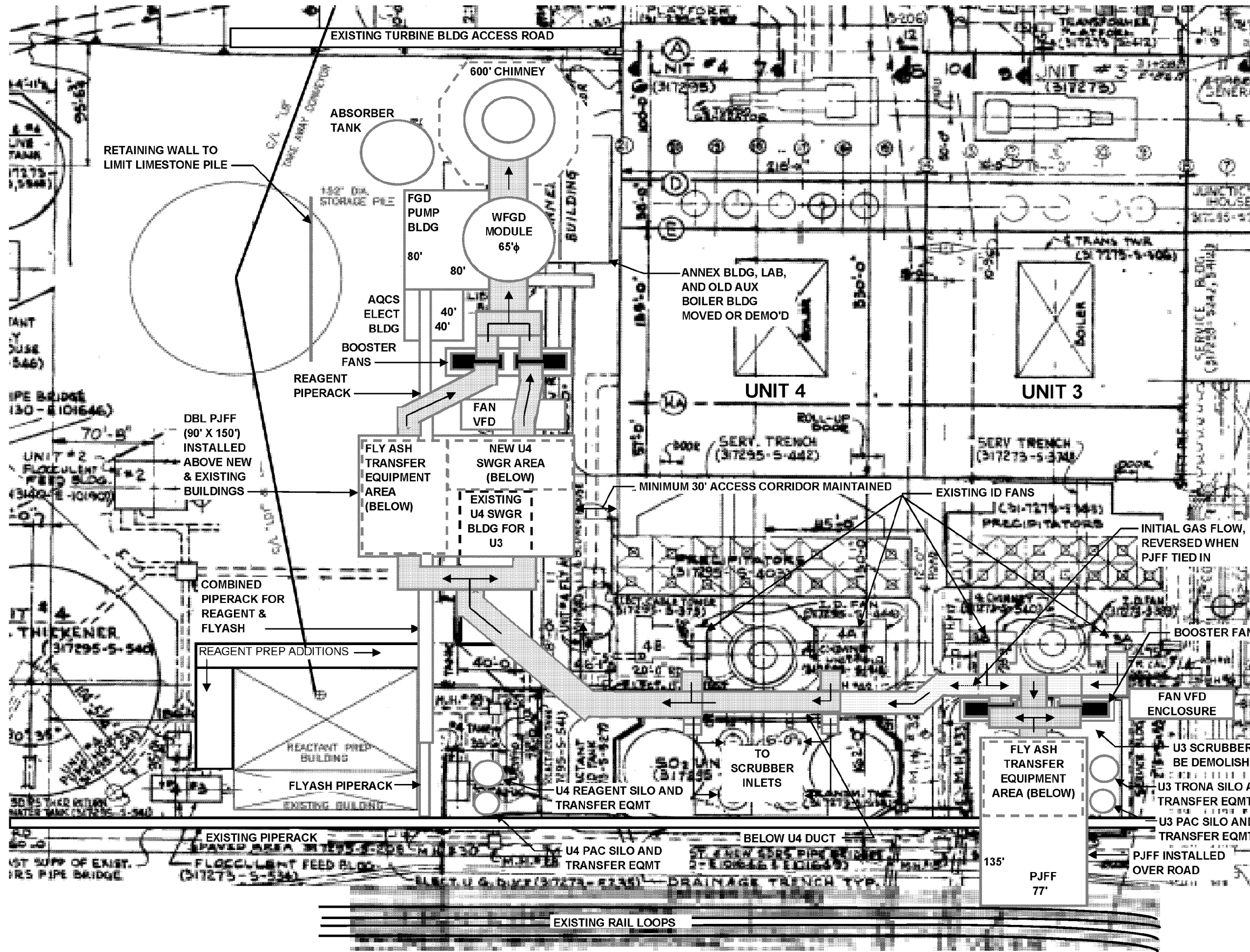
APPROX SCALE



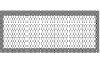
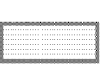

MILL CREEK 1 & 2

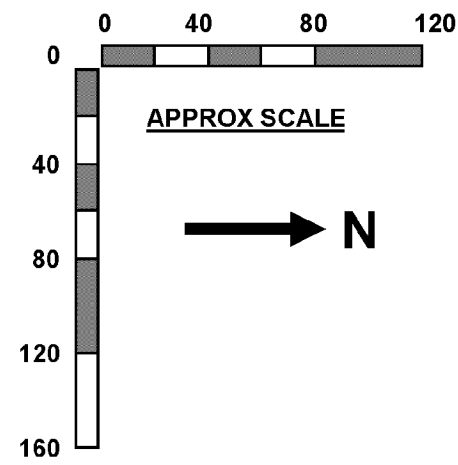
**Unit 3 and 4
Pulse Jet Fabric Filter Alternatives (A and B)**





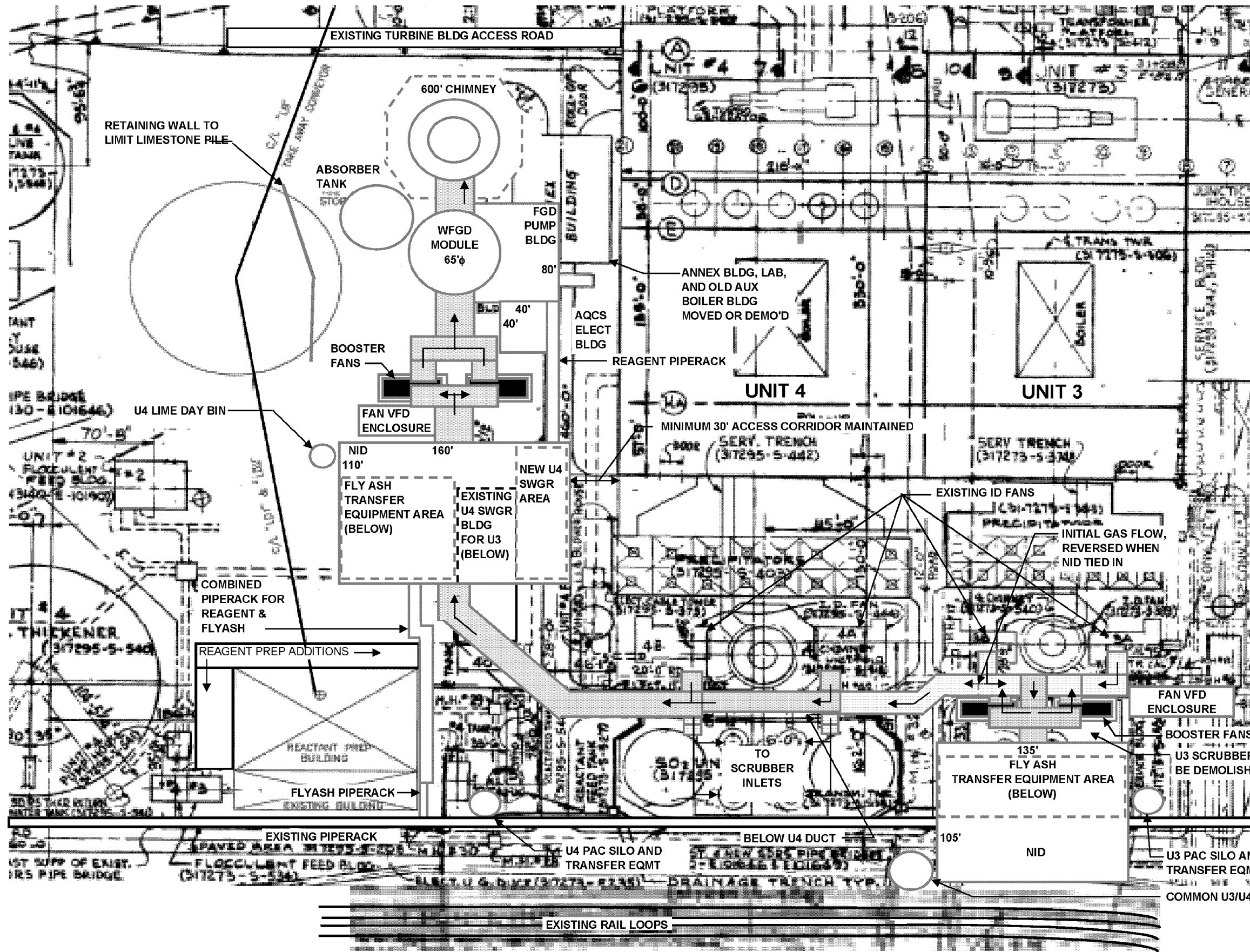
**UNIT 3 / UNIT 4
PJFF ARRANGEMENT B
CONCEPTUAL SKETCH
USING PJFF & NEW BOOSTER
FAN AT UNIT 3 W/ REUSE
OF UNIT 4 SCRUBBER & CHIMNEY,
AND PJFF, NEW BOOSTER
FANS, WET FGD &
CHIMNEY AT UNIT 4**

-  U4 DUCTWORK
15' & 22' SQ ASSUMED
-  U3 DUCTWORK - PHASE I
14' & 20' SQ ASSUMED
-  U3 DUCTWORK - PHASE II
14' & 20' SQ ASSUMED






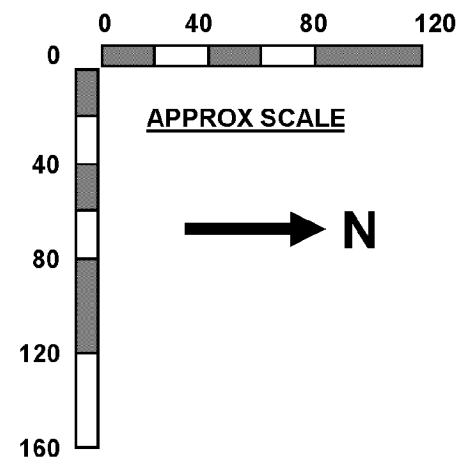
MILL CREEK 3 & 4

**Unit 3 and 4
Novel Innovative Desulfurization System Alternatives (A and B)**



**UNIT 3 / UNIT 4
NID ARRANGEMENT B
CONCEPTUAL SKETCH
USING NID & NEW BOOSTER
FAN AT UNIT 3 W/ REUSE
OF UNIT 4 SCRUBBER & CHIMNEY,
AND NID, NEW BOOSTER
FANS, WET FGD &
CHIMNEY AT UNIT 4**

-  U4 DUCTWORK
17' & 22' SQ ASSUMED
-  U3 DUCTWORK - PHASE I
15' & 20' SQ ASSUMED
-  U3 DUCTWORK - PHASE II
15' & 20' SQ ASSUMED

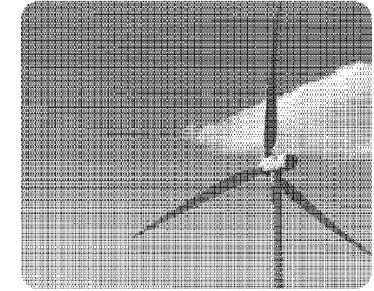
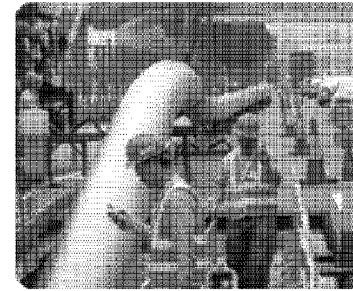
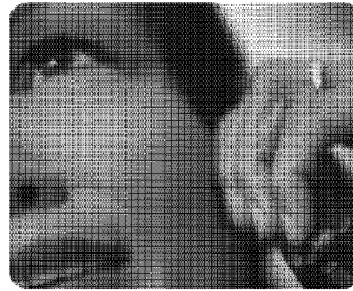
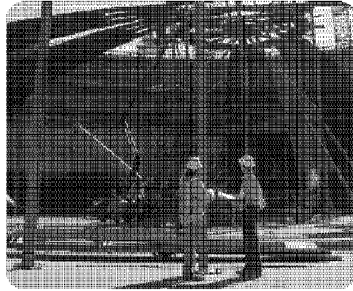
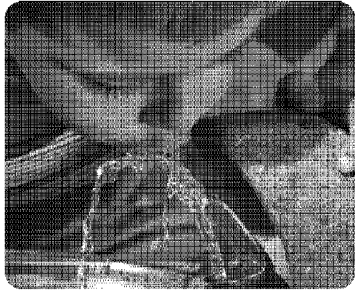


MILL CREEK 3 & 4

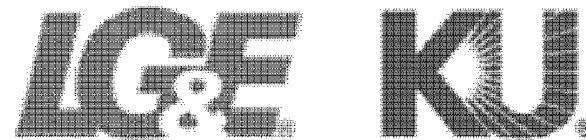
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BLACK & VEATCH



Phase II AQC Study Mill Creek Validation



PPL companies

Black & Veatch

November 2010



Agenda

- Units 1, 2, 3 and 4 AQC equipment train
- AQC equipment layout validation
 - Conceptual sketches
 - 3-D models
- NID vs PJFF comparison
- Summary / wrap-up and discussions

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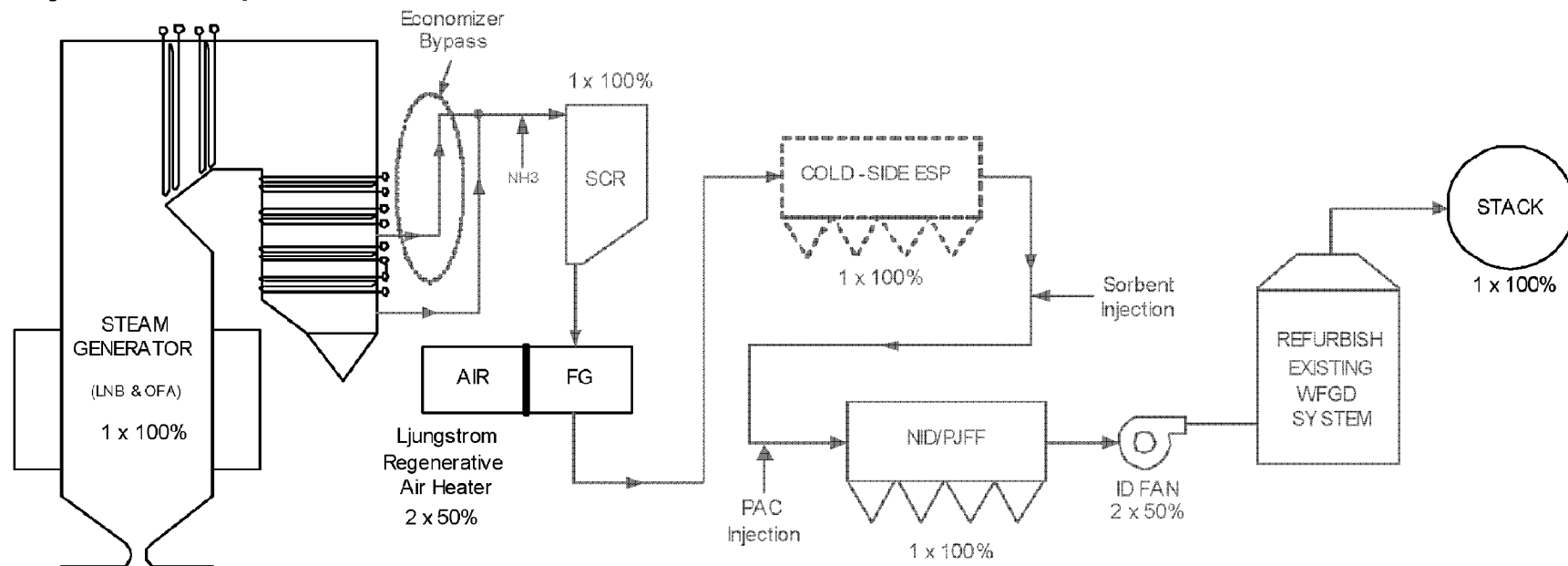


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AQC Equipment Train Mill Creek Units 1, 2, 3 and 4

Mill Creek Unit 1 AQC process flow diagram

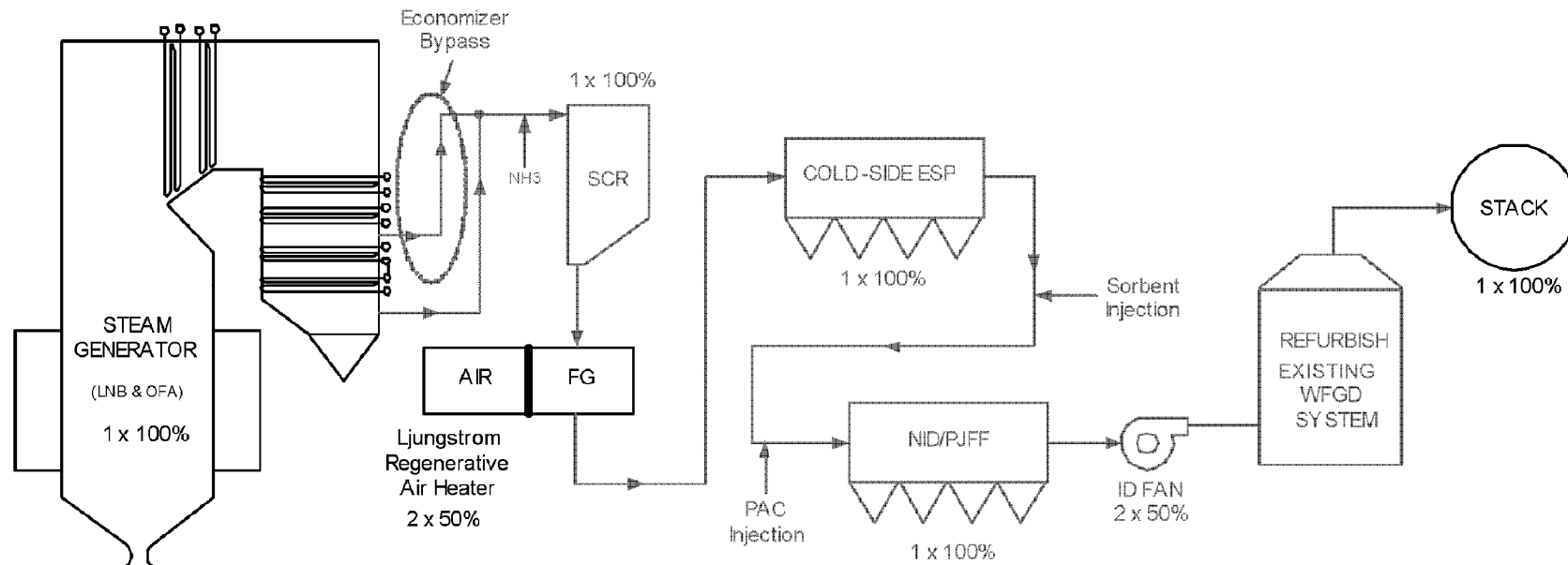
- Add new pre-filter CS-ESP (alternative)
- Add new ID fans
- Add new NID or PJFF/duct injection option
- Demolish existing CS-ESP
- Add new SCR at old CS-ESP
- Upgrade and refurbish existing WFGD system





Mill Creek Unit 2 AQC process flow diagram

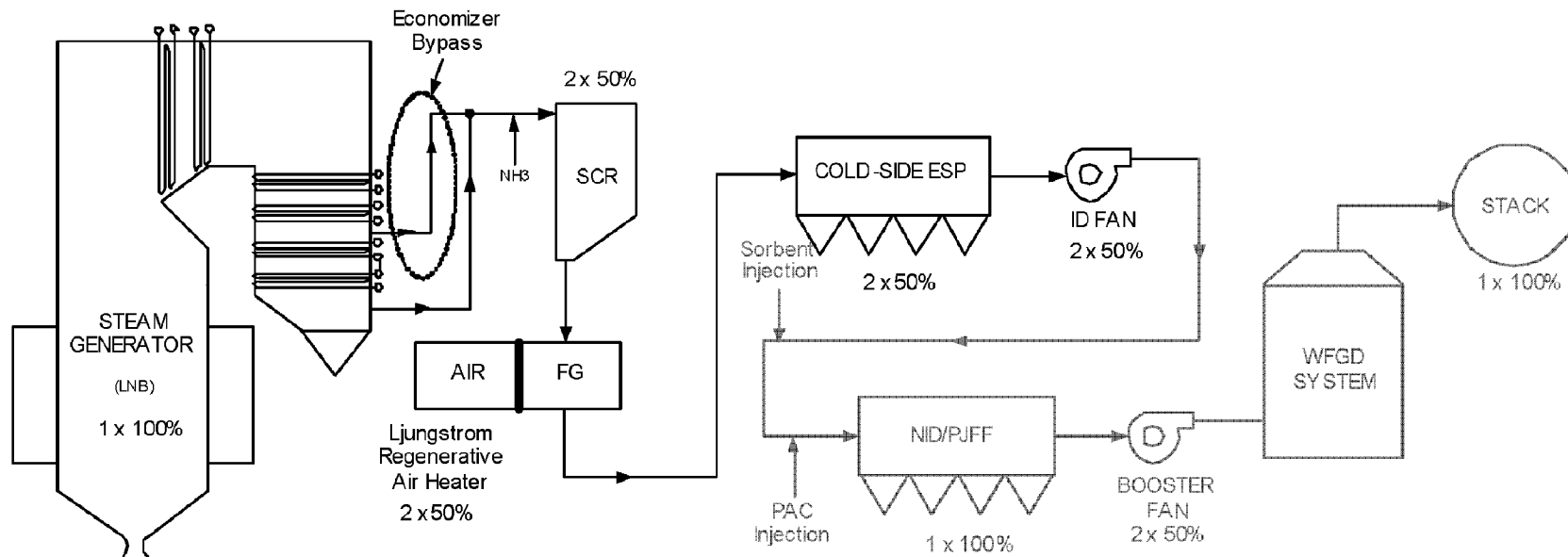
- Add new CS-ESP (pre-filter)
- Add new ID fans
- Add new NID or PJFF/duct injection option
- Demolish existing CS-ESP
- Add new SCR at old CS-ESP
- Upgrade and refurbish existing WFGD system





Mill Creek Unit 4 AQC process flow diagram

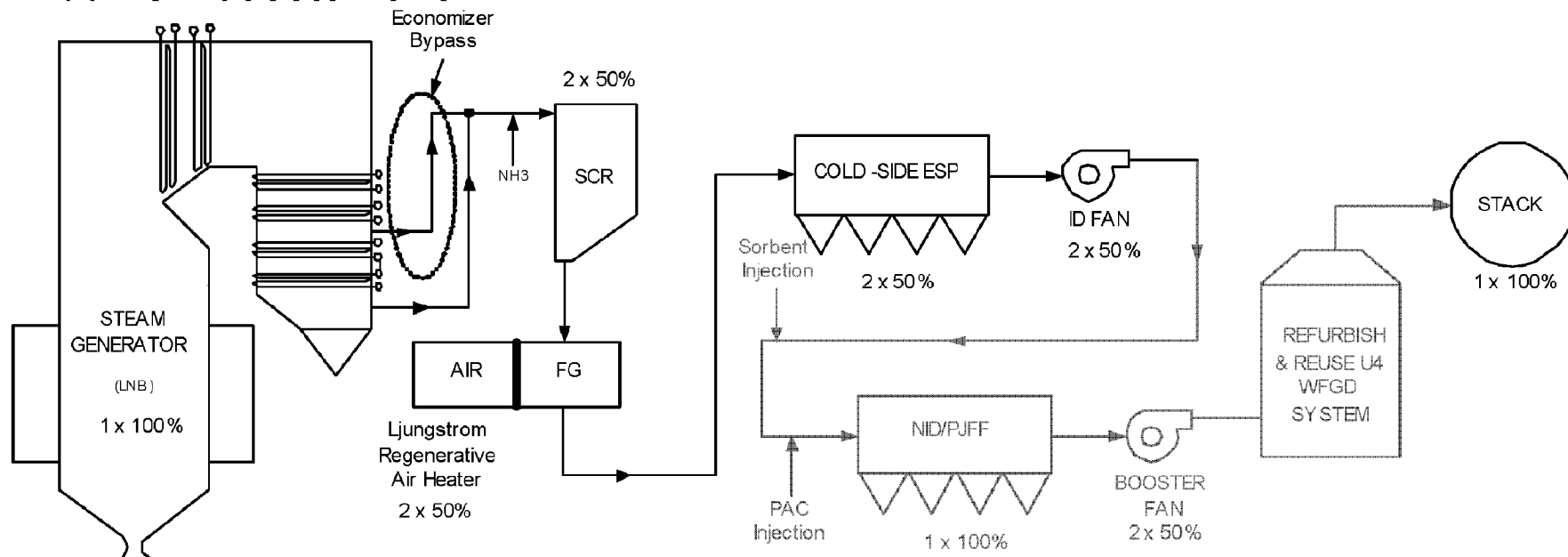
- Add new stack
- Add new NID or PJFF/duct injection option
- Add new booster fans
- Add new Unit 4 WFGD





Mill Creek Unit 3 AQC process flow diagram

- Upgrade and refurbish existing Unit 4 WFGD to re-use as unit 3 WFGD
- Reuse Unit 4 stack for Unit 3 (following Reuse of Unit 4 WFGD)
- Demolish existing Unit 3 WFGD
- Add new NID or PJFF/duct injection option
- Add new booster fans



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AQC Equipment Layout Validation



AQC validation

- Validation report determined no fatal flows for the selected AQC equipment
- AQC equipment can meet identified emission targets
- Two or more arrangements possible for AQC equipment
- Pros and cons identified for each alternative



AQC conceptual sketches

Unit 1 and Unit 2

- 3 NID alternatives (A, B, and C)
- 3 PJFF alternatives (A, B, and C)
- Unit 3 and Unit 4
 - 2 NID alternatives (A and B)
 - 2 PJFF alternatives (A and B)

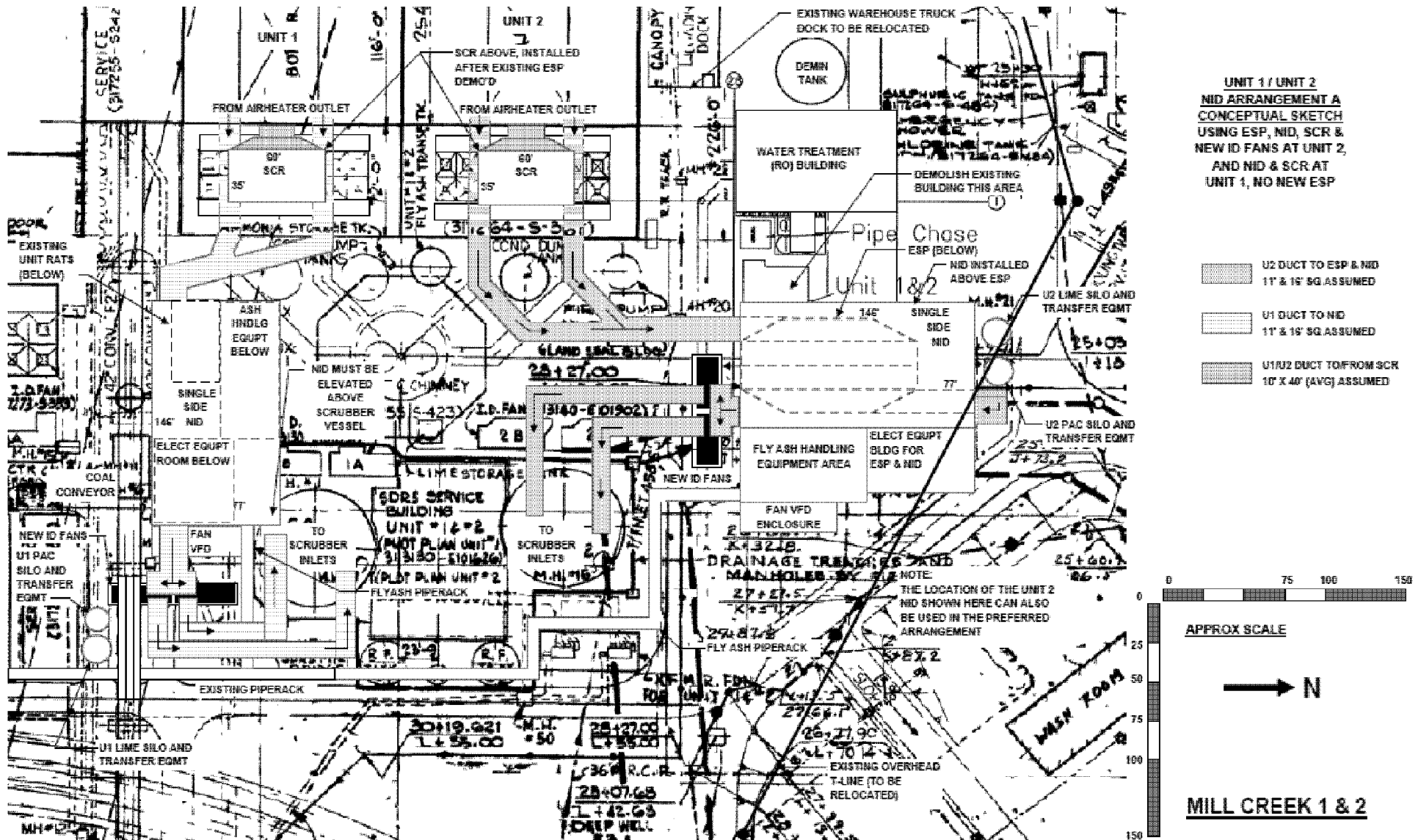
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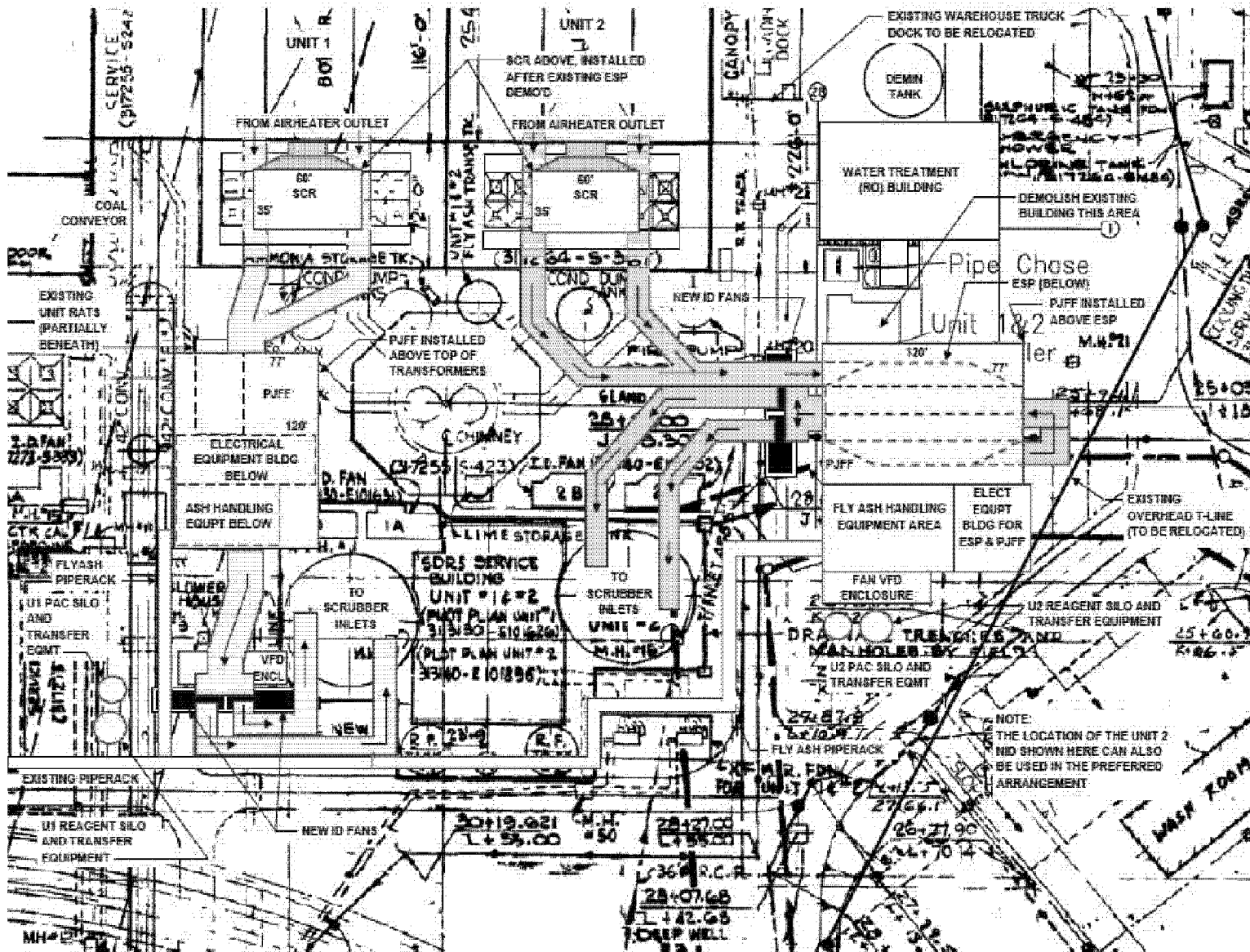
Unit 1 and 2 Conceptual Sketches

Mill Creek Unit 1 and Unit 2 (NID arrangement A)



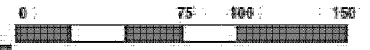


Mill Creek Unit 1 and Unit 2 (PJFF arrangement A)

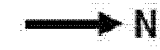


**UNIT 1 / UNIT 2
PJFF ARRANGEMENT A
CONCEPTUAL SKETCH
USING ESP, PJFF, SCR &
NEW ID FANS AT UNIT 2,
AND PJFF & SCR AT
UNIT 1, NO NEW ESP**

- U2 DUCT TO ESP & MID
11' x 16' SQ ASSUMED
- U1 DUCT TO MID
11' x 16' SQ ASSUMED
- U1/U2 DUCT TO/FROM SCR
10' x 40' (AVG) ASSUMED



APPROX SCALE



MILL CREEK 1 & 2

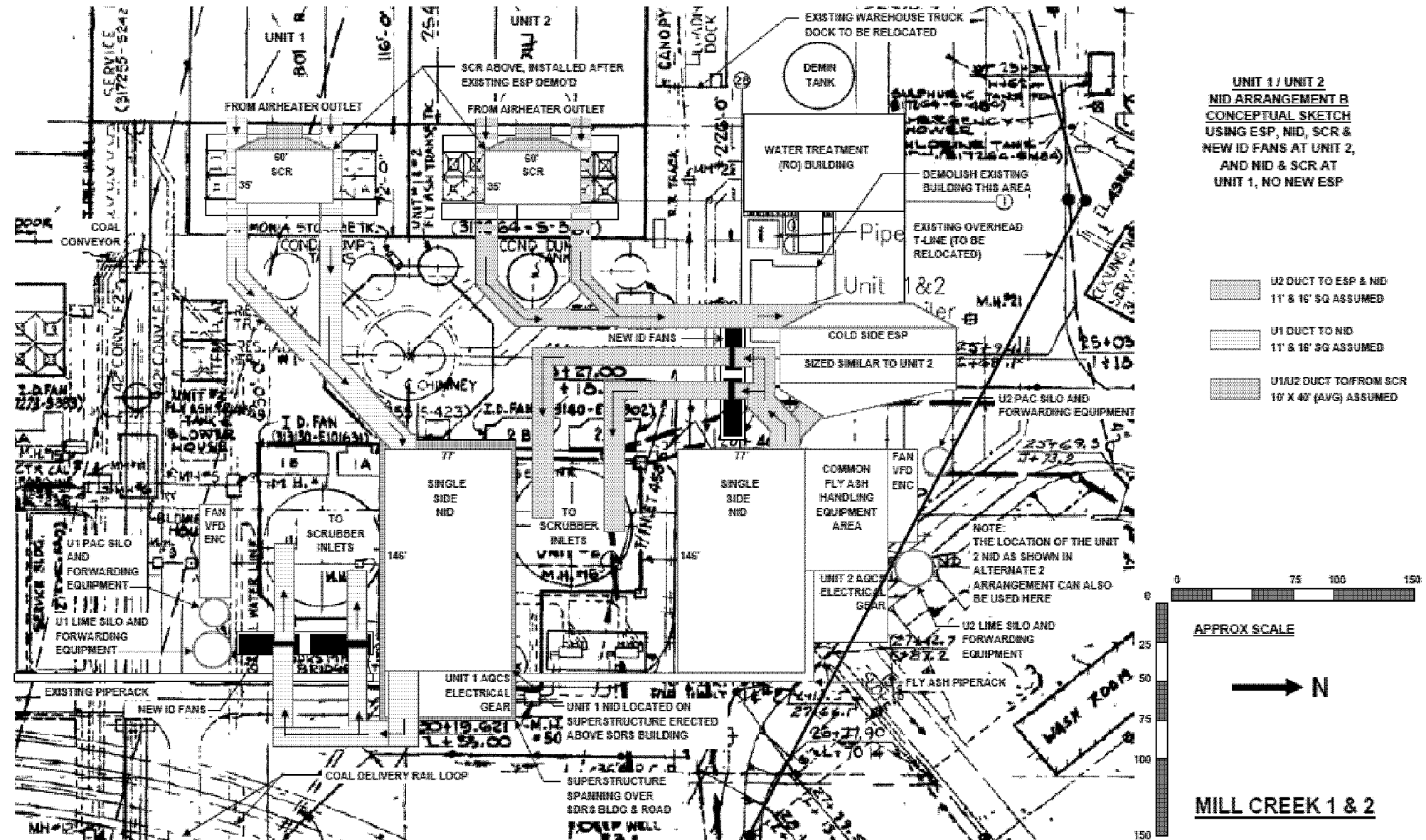
NOTE:
THE LOCATION OF THE UNIT 2
MID SHOWN HERE CAN ALSO
BE USED IN THE PREFERRED
ARRANGEMENT



Mill Creek Unit 1 and Unit 2 (arrangement A)

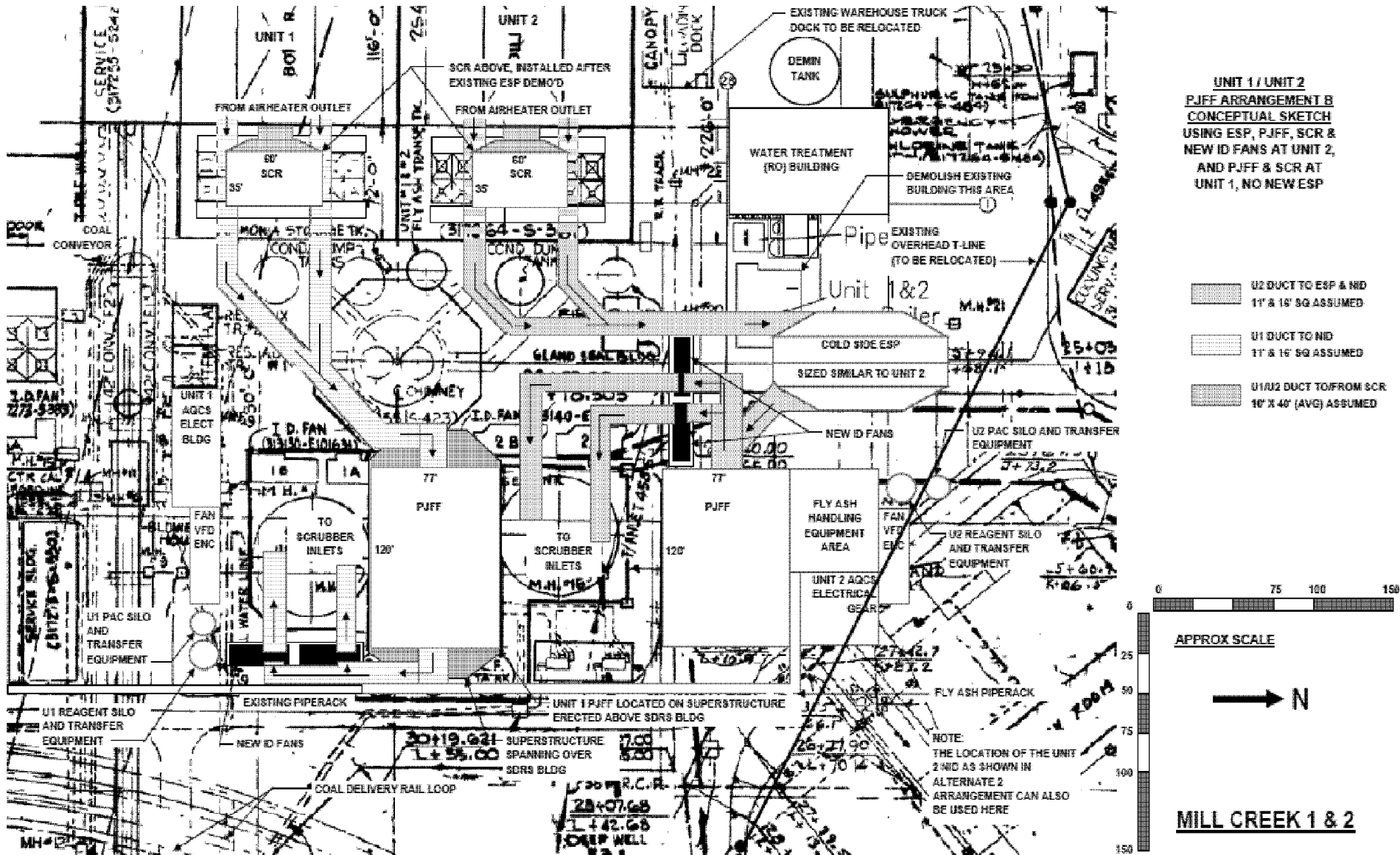
- Pros:
 - Optimized ductwork – less capital cost and pressure drop
 - Less ash drop out during low load
- Cons:
 - No pre-filter CS-ESP for Unit 1 only due to space constraints
 - Unit 1 requires ash land-filling capacity
 - Restricted access for Unit 1 SCR construction
 - Elevated structure required for NID or PJFF
 - Unit 1 and Unit 2 auxiliary boiler building requires demolition
 - Relocate overhead transmission lines north of Unit 2

Mill Creek Unit 1 and Unit 2 (NID arrangement B)





Mill Creek Unit 1 and Unit 2 (PJFF arrangement B)



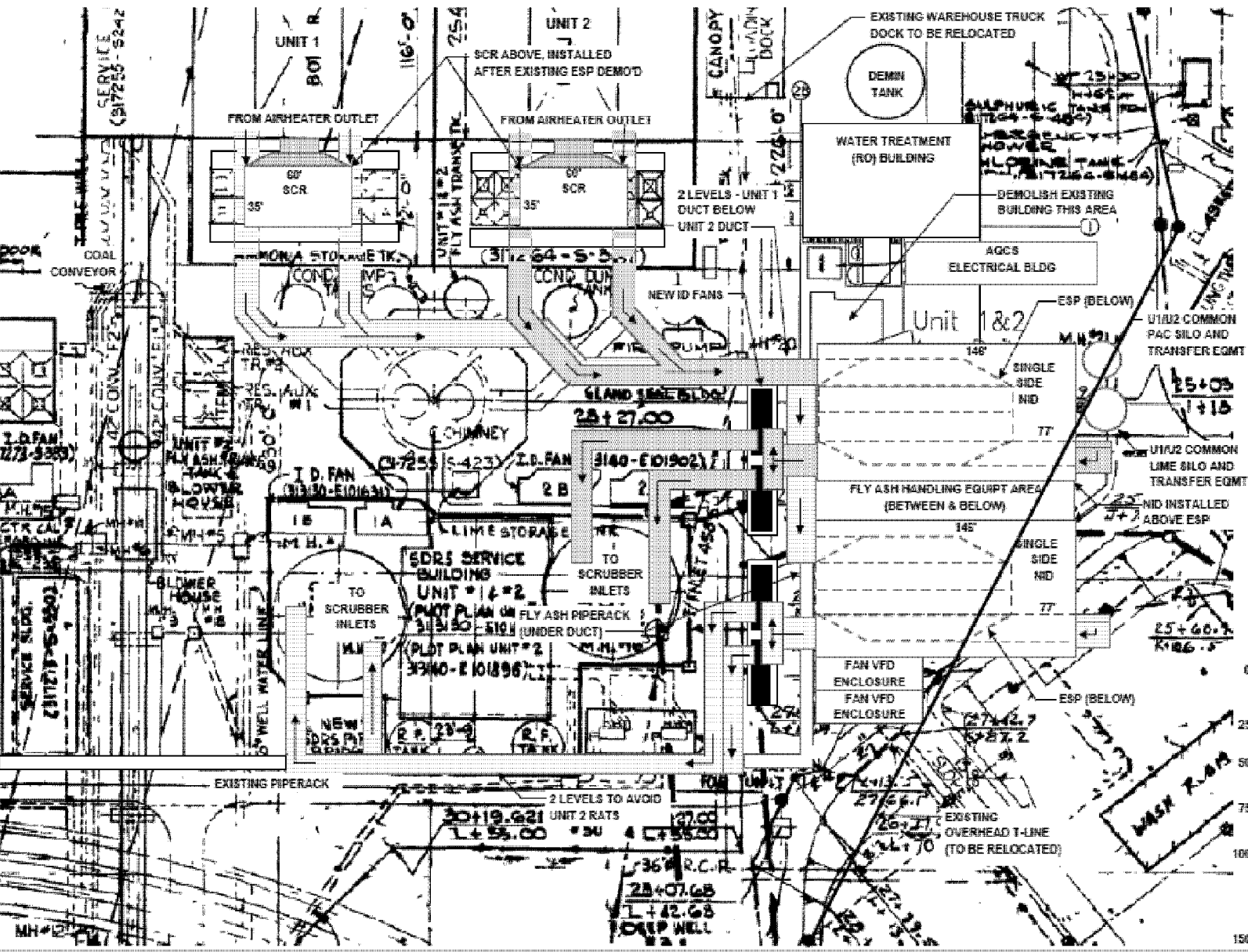


Mill Creek Unit 1 and Unit 2 (arrangement B)

- Pros:
 - Optimized ductwork – less capital cost and pressure drop
 - Less ash drop out during low load
- Cons:
 - No pre-filter CS-ESP for Unit 1 – space constraints
 - Unit 1 requires ash land-filling capacity
 - Elevated structure required for NID or PJFF
 - Unit 1 and Unit 2 auxiliary boiler building requires demolition
 - Relocate overhead transmission lines north of Unit 2

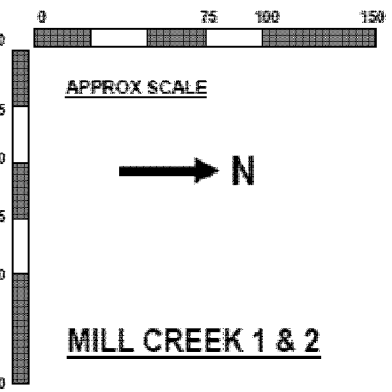


Mill Creek Unit 1 and Unit 2 (NID arrangement C)



**UNIT 1 / UNIT 2
NID ARRANGEMENT C
CONCEPTUAL SKETCH
NEW NID, SCR, ESP, AND
ID FANS AT UNITS 1 & 2**

- U2 DUCT TO ESP & NID
11' & 16' SQ ASSUMED
- U1 DUCT TO NID
11' & 16' SQ ASSUMED
- U1/U2 COMMON
LIME SILO AND
TRANSFER EQMT
10' X 40' (AVG) ASSUMED



MILL CREEK 1 & 2



Mill Creek Unit 1 and Unit 2 (arrangement C)

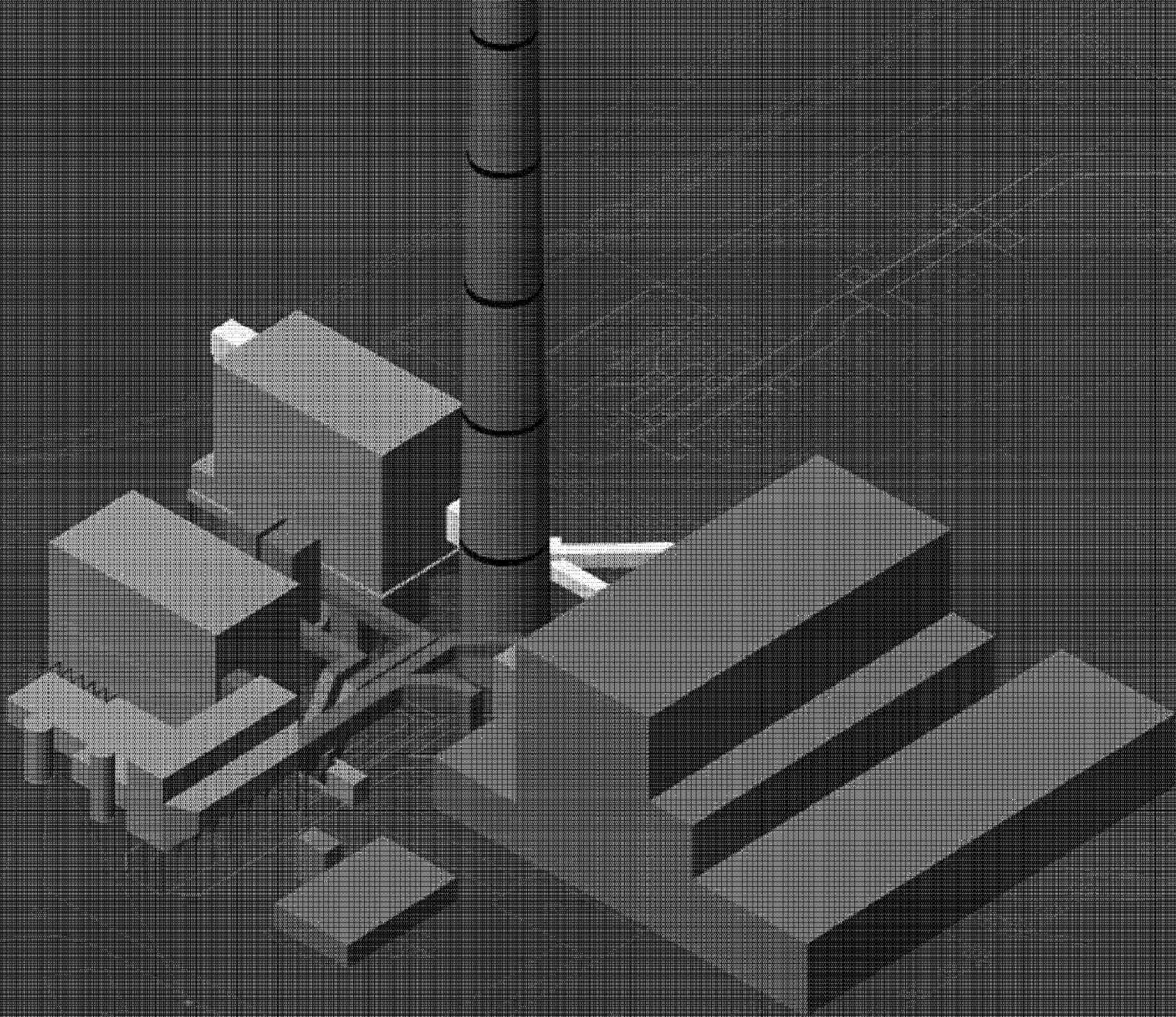
- Pros:
 - New CS-ESP pre-filter for Unit 1 and Unit 2 – reduced ash land-fill capacity required
 - Constructability advantage
- Cons:
 - Longer ductwork – higher capital costs and increased pressure drop
 - Higher potential for ash dropout
 - Elevated structure required for NID or PJFF
 - Unit 1 and Unit 2 auxiliary boiler building requires demolition
 - Relocate overhead transmission lines north of Unit 2

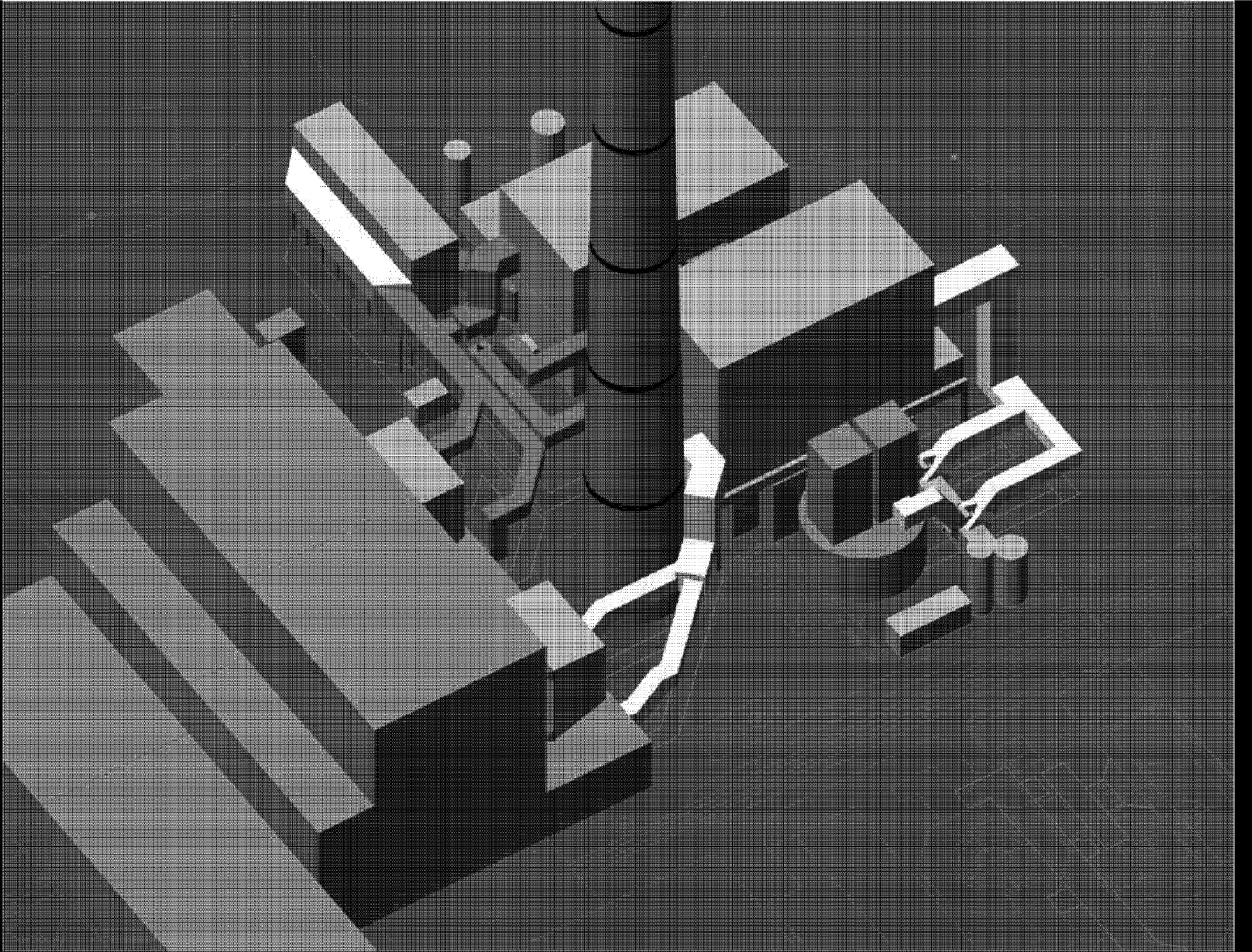
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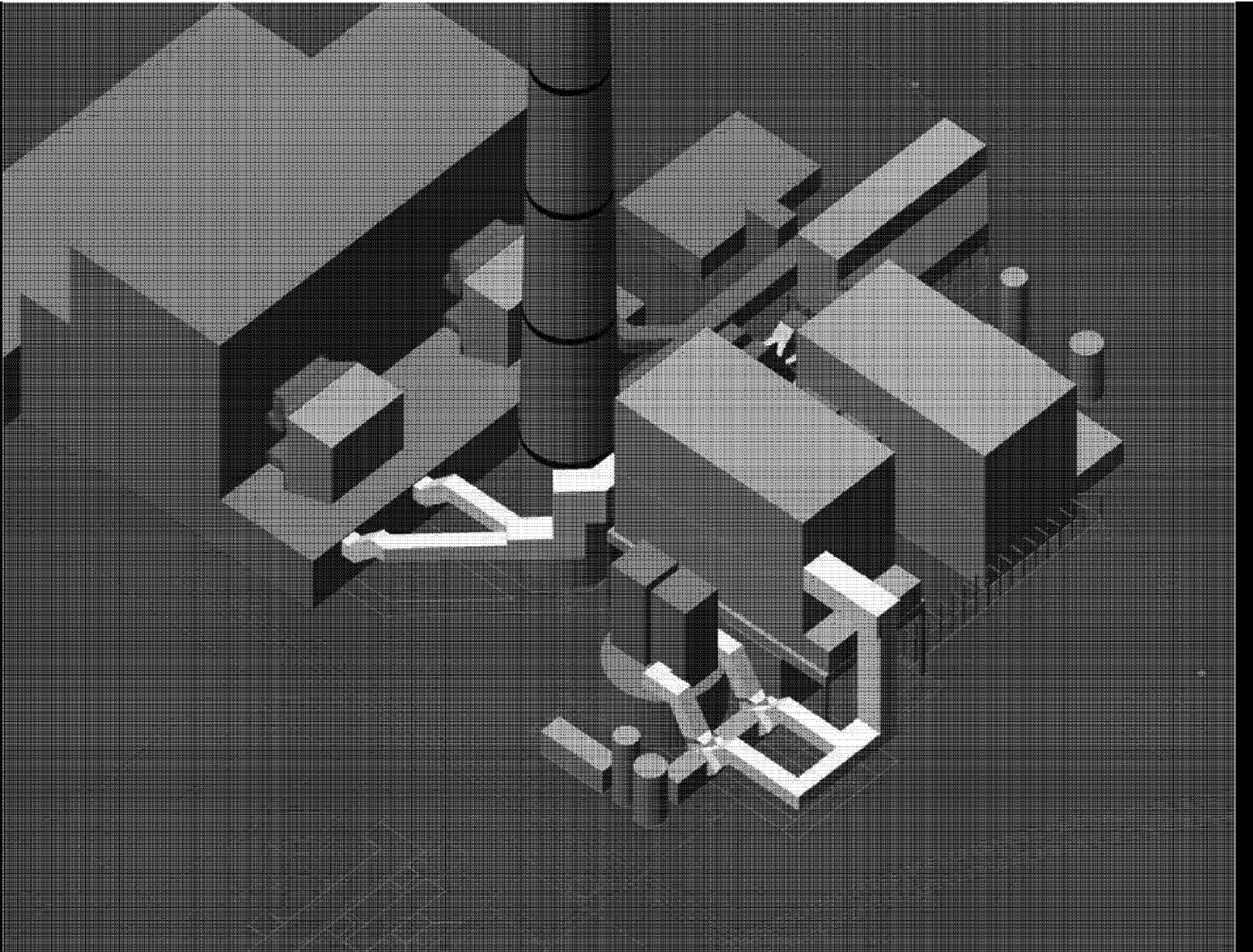


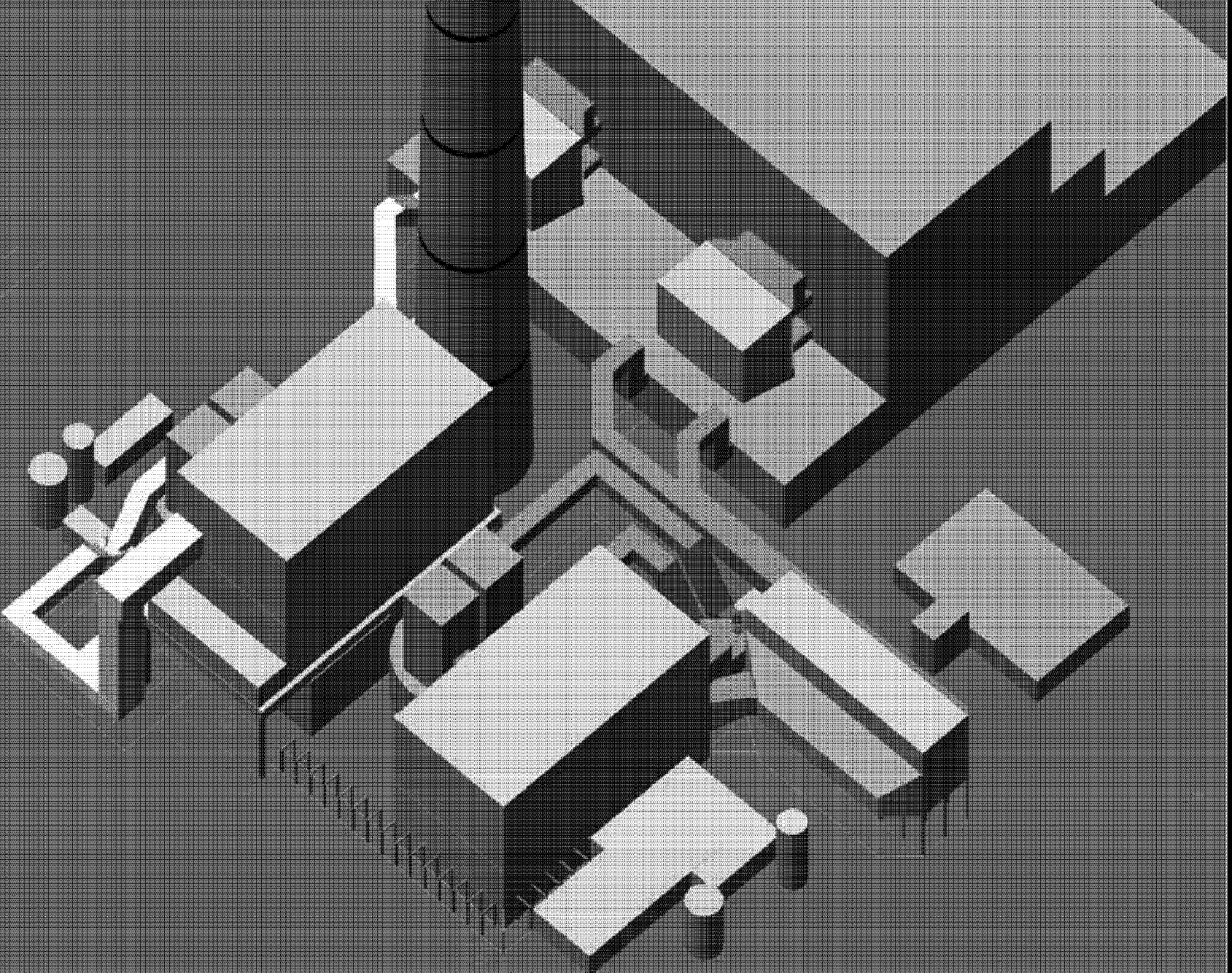
BLACK & VEATCH

Unit 1 and 2 3-D Model Arrangement B







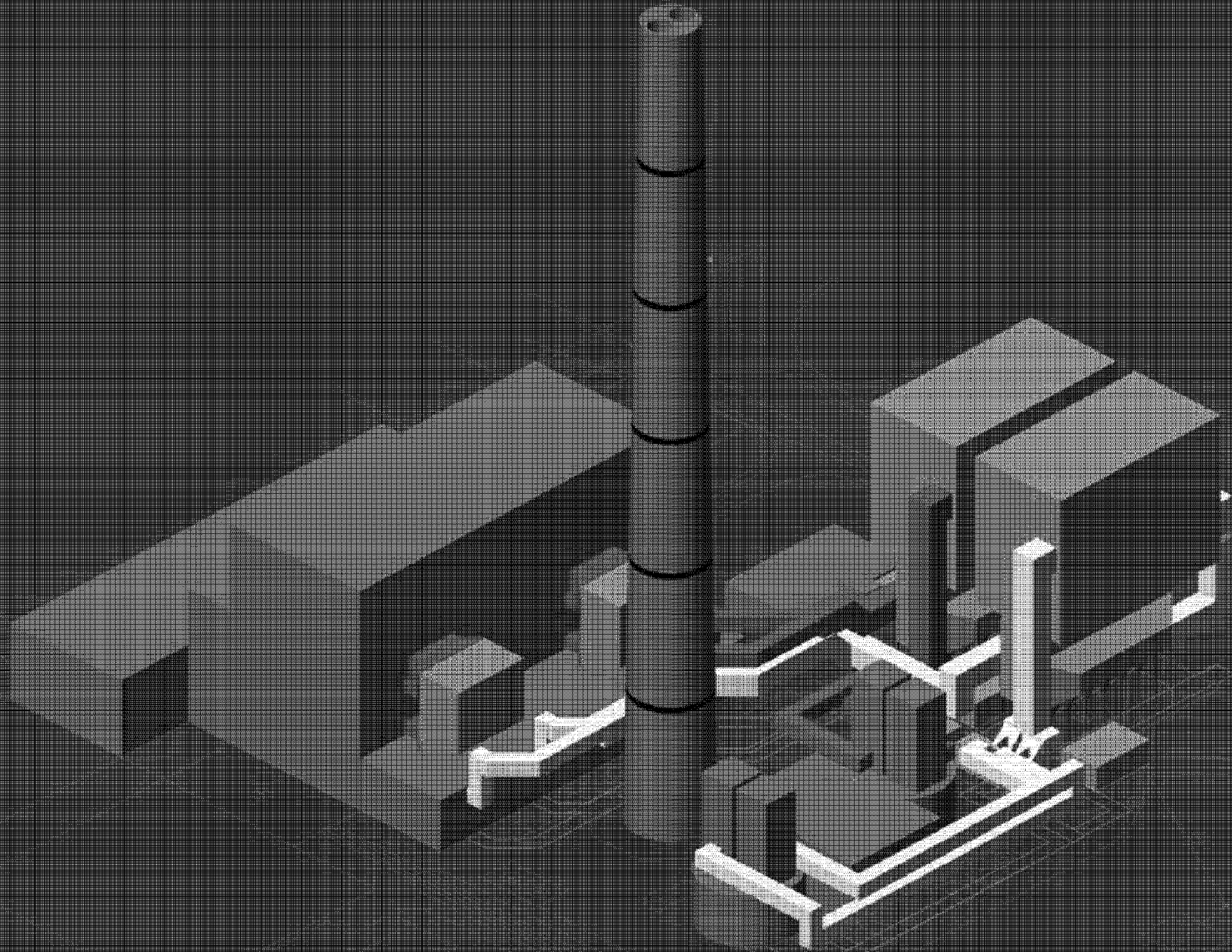


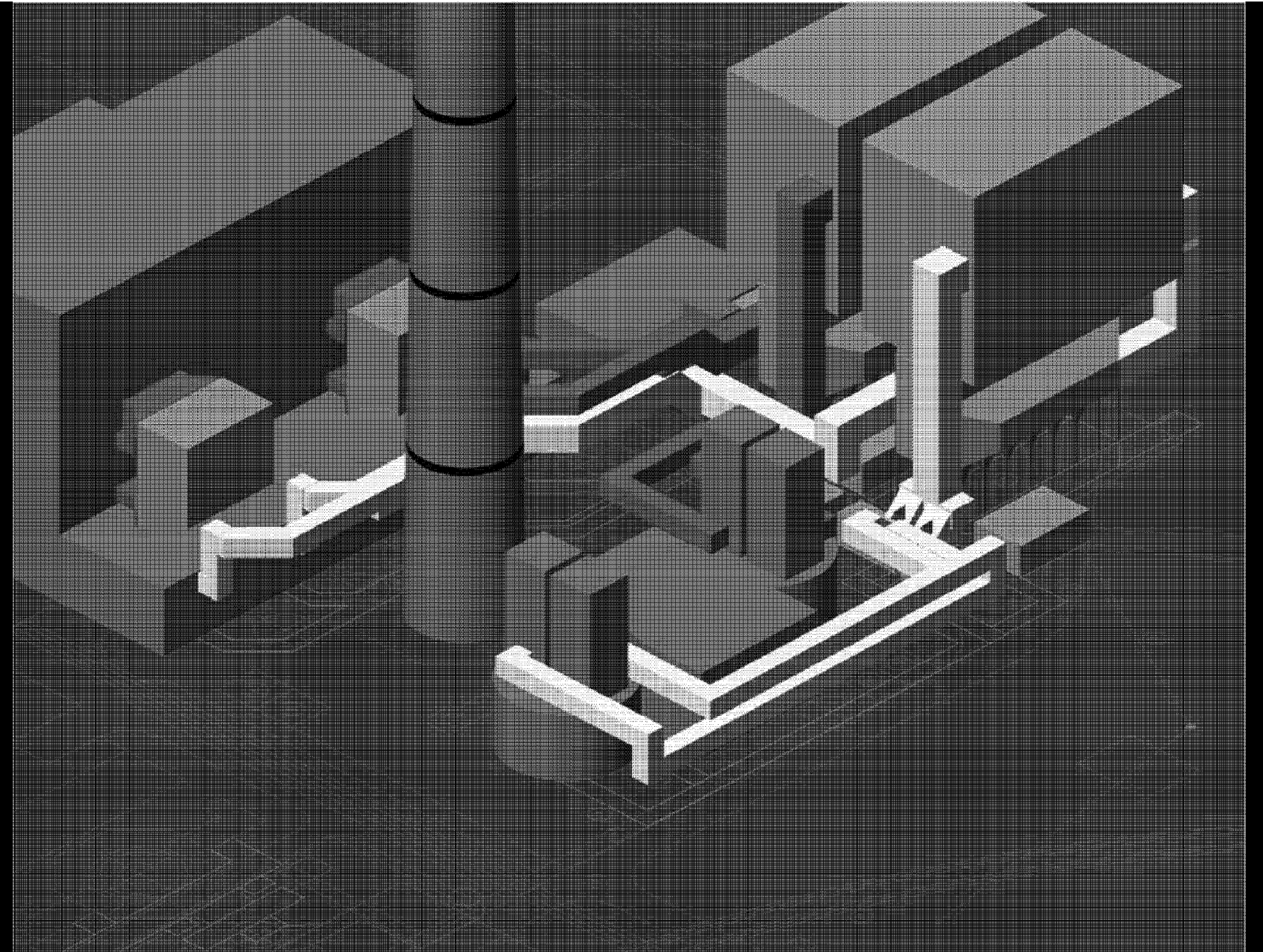
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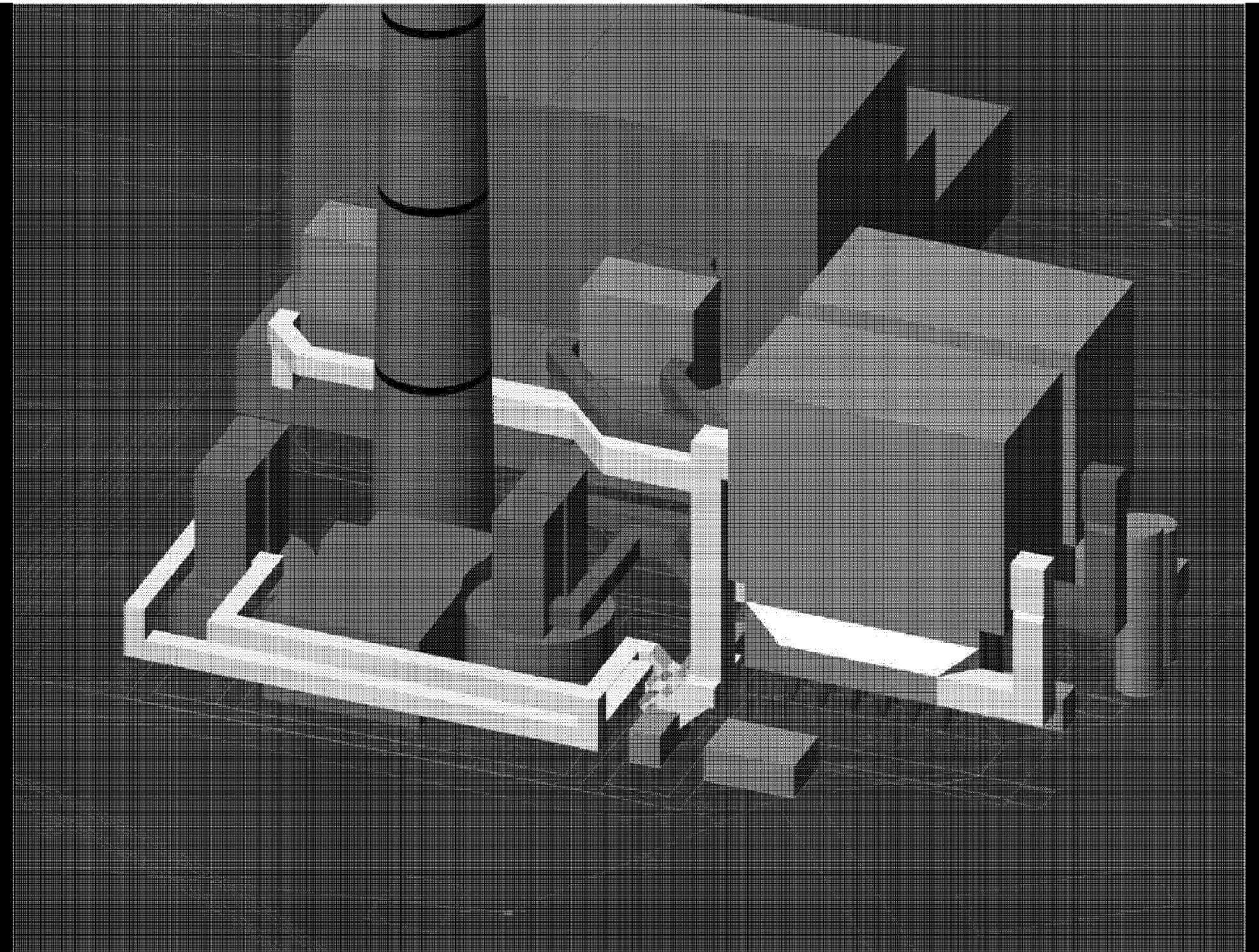


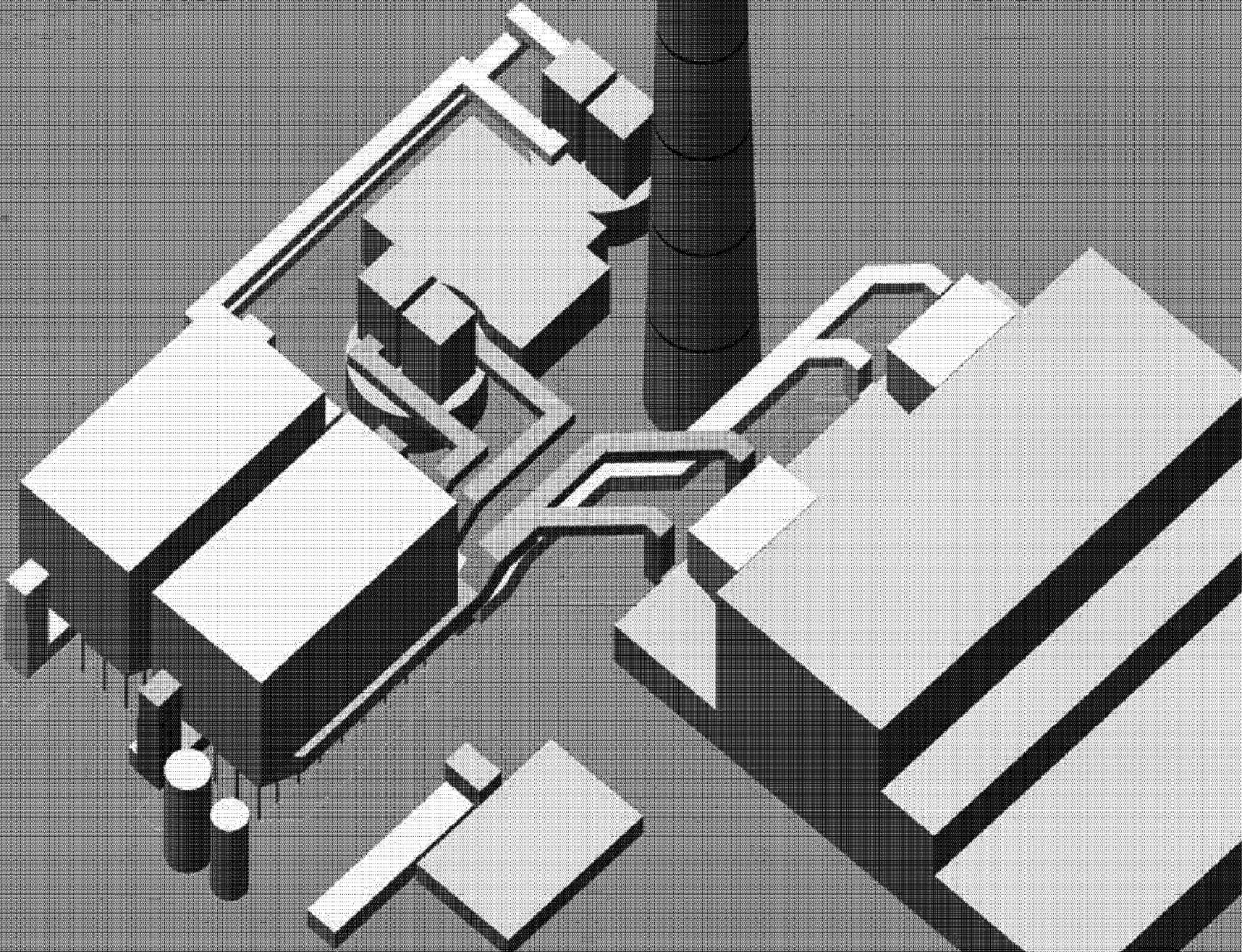
BLACK & VEATCH

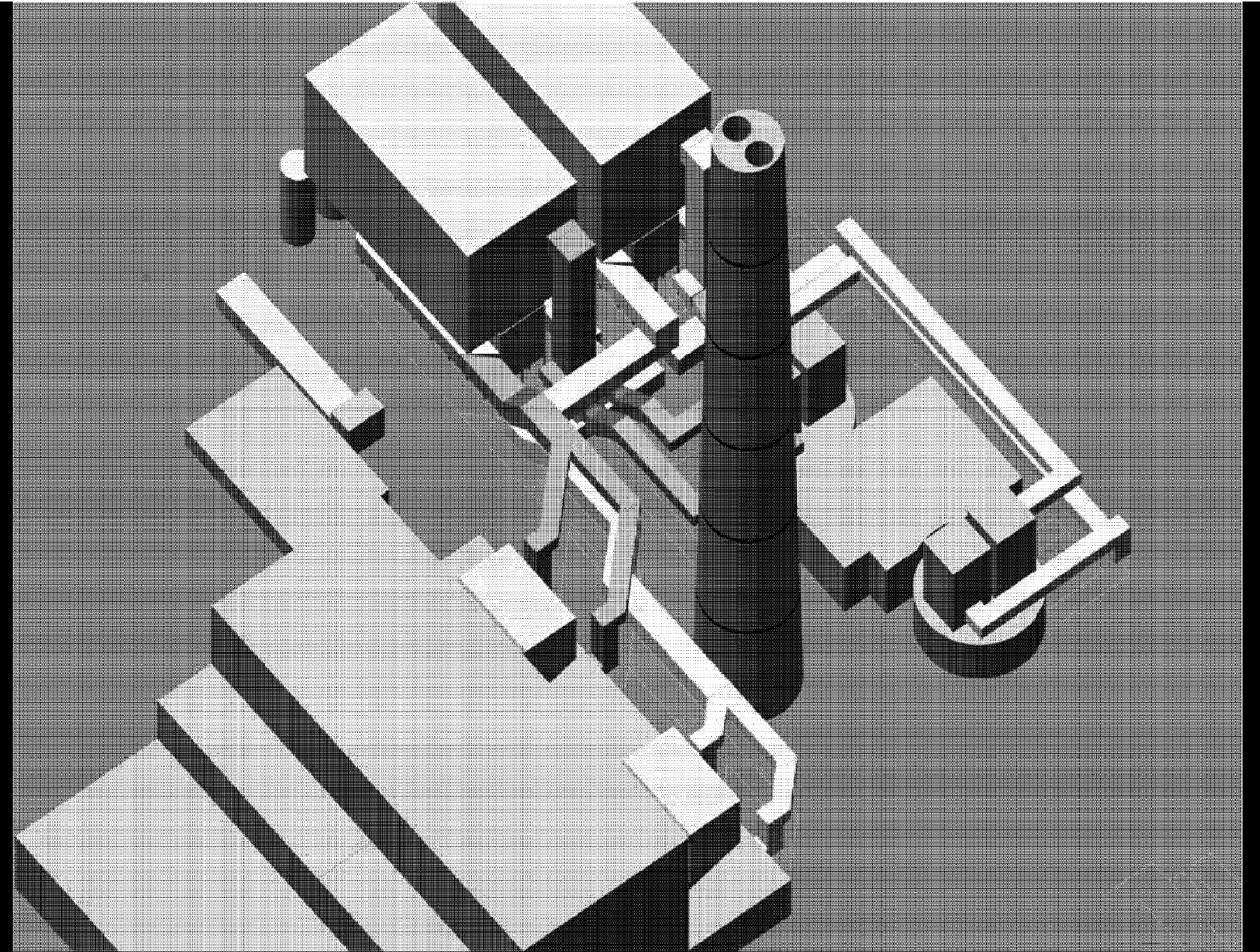
Unit 1 and 2 3-D Model Arrangement C











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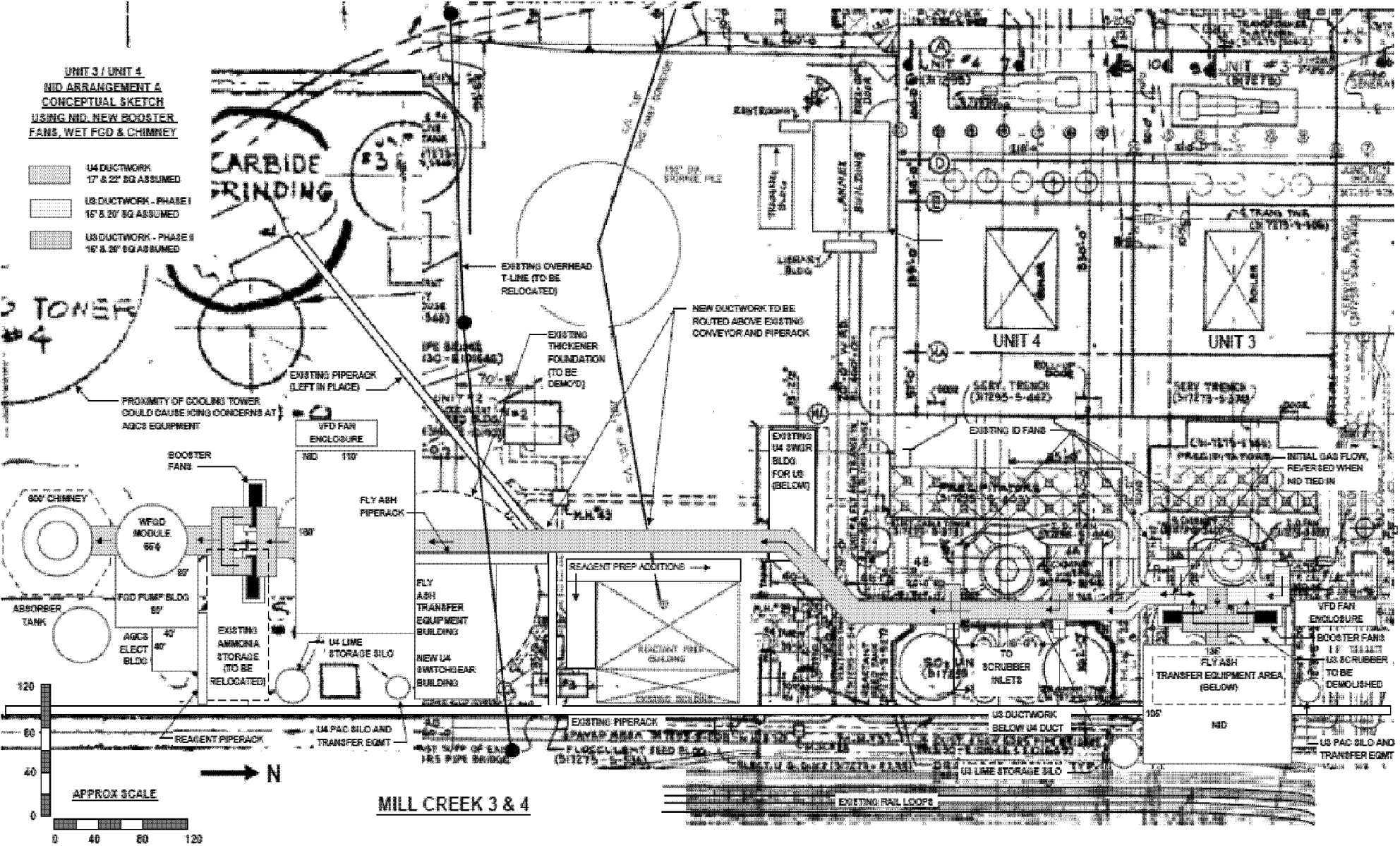
BLACK & VEATCH

Unit 3 and 4 Conceptual Sketches

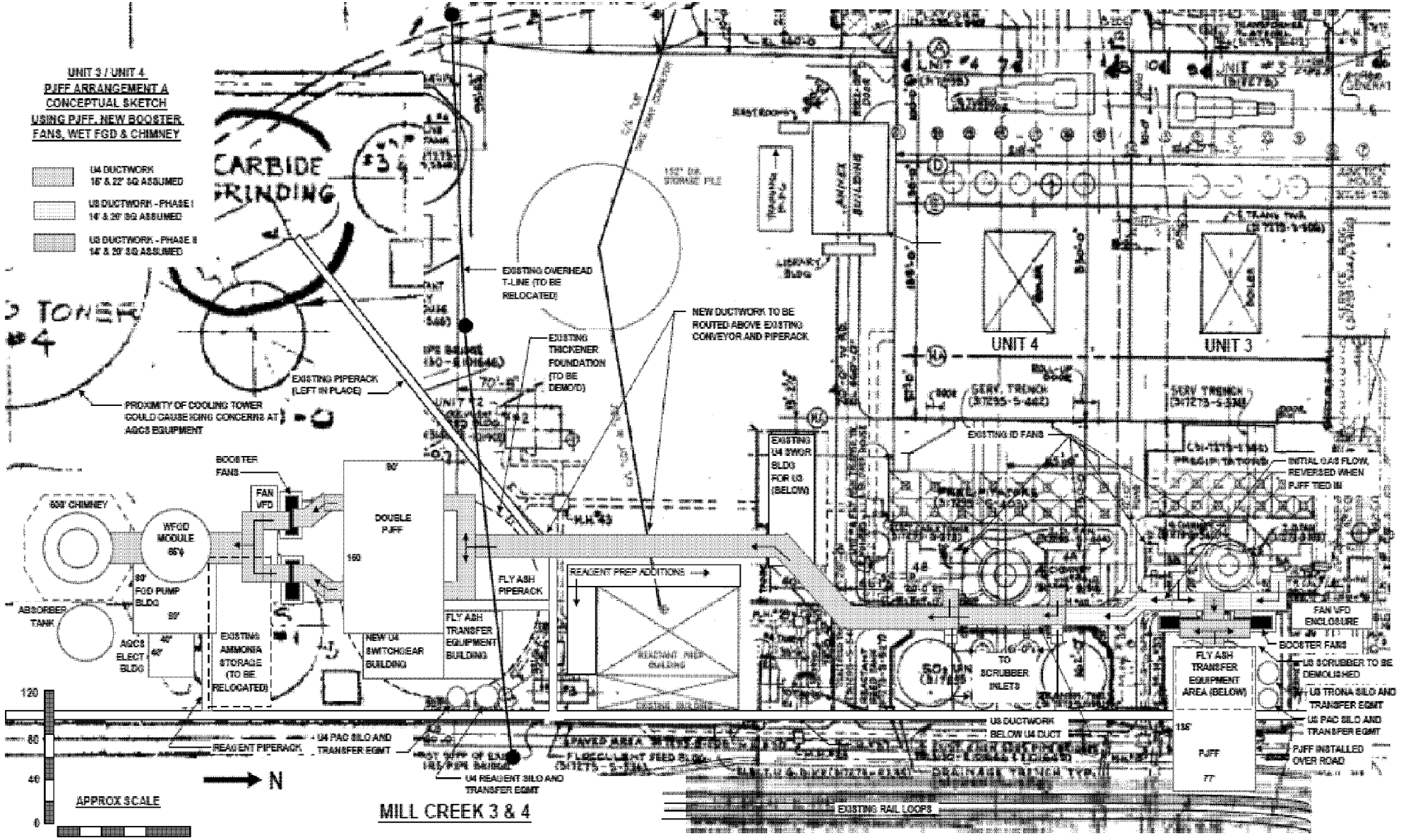
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Mill Creek Unit 3 and Unit 4 (NID arrangement A)



Mill Creek Unit 3 and Unit 4 (PJFF arrangement A)





Mill Creek Unit 3 and Unit 4 (arrangement A)

- Pros:
 - Constructability advantage
 - Capital cost savings for Unit 3 by re-using Unit 4 scrubber modules and stack
- Cons:
 - Additional ductwork (above existing limestone conveyor)
 - Demolition of abandoned thickener
 - Relocation of ammonia storage and overhead transmission lines
 - Close proximity with cooling tower - icing concerns



Mill Creek Unit 3 and Unit 4 (arrangement B)

- Pros:
 - Less ductwork
 - Capital cost savings for Unit 3 by re-using Unit 4 scrubber modules and stack
- Cons:
 - Demolition and relocation of annex building, lab building and old auxiliary boiler building
 - Limited access to Unit 4 boiler



Unit 4 arrangement 'A' and 'B' comparison

Factor	Arrangement "A"	Arrangement "B"
	North-South	East-West
Constructability	Better	Challenge
Access	Good	Challenge
Ductwork	Longer (150' extra)	Base
Demolition	More	Less
Relocation	More	Less



Unit 4 arrangement 'A' and 'B' comparison

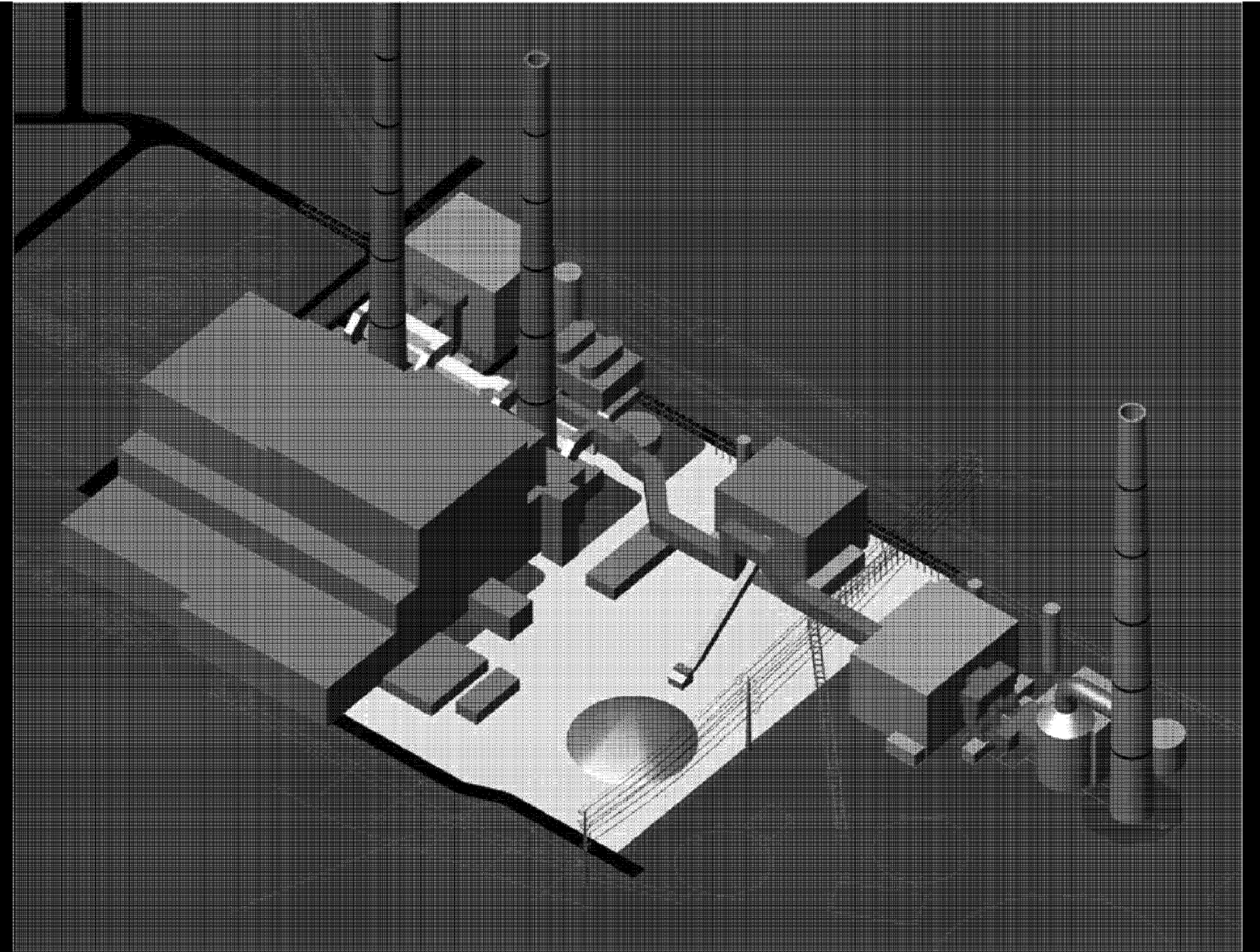
Factor	Arrangement "A" North-South	Arrangement "B" East-West
Overhead power lines	Demolish & relocate	NA
Abandoned thickener	Demolish	NA
Ammonia storage	Demolish & relocate	NA
Annex, lab, and old auxiliary boiler bldg.	NA	Demolish & relocate
Cooling tower proximity	Major Icing concerns	Minor Icing Concerns

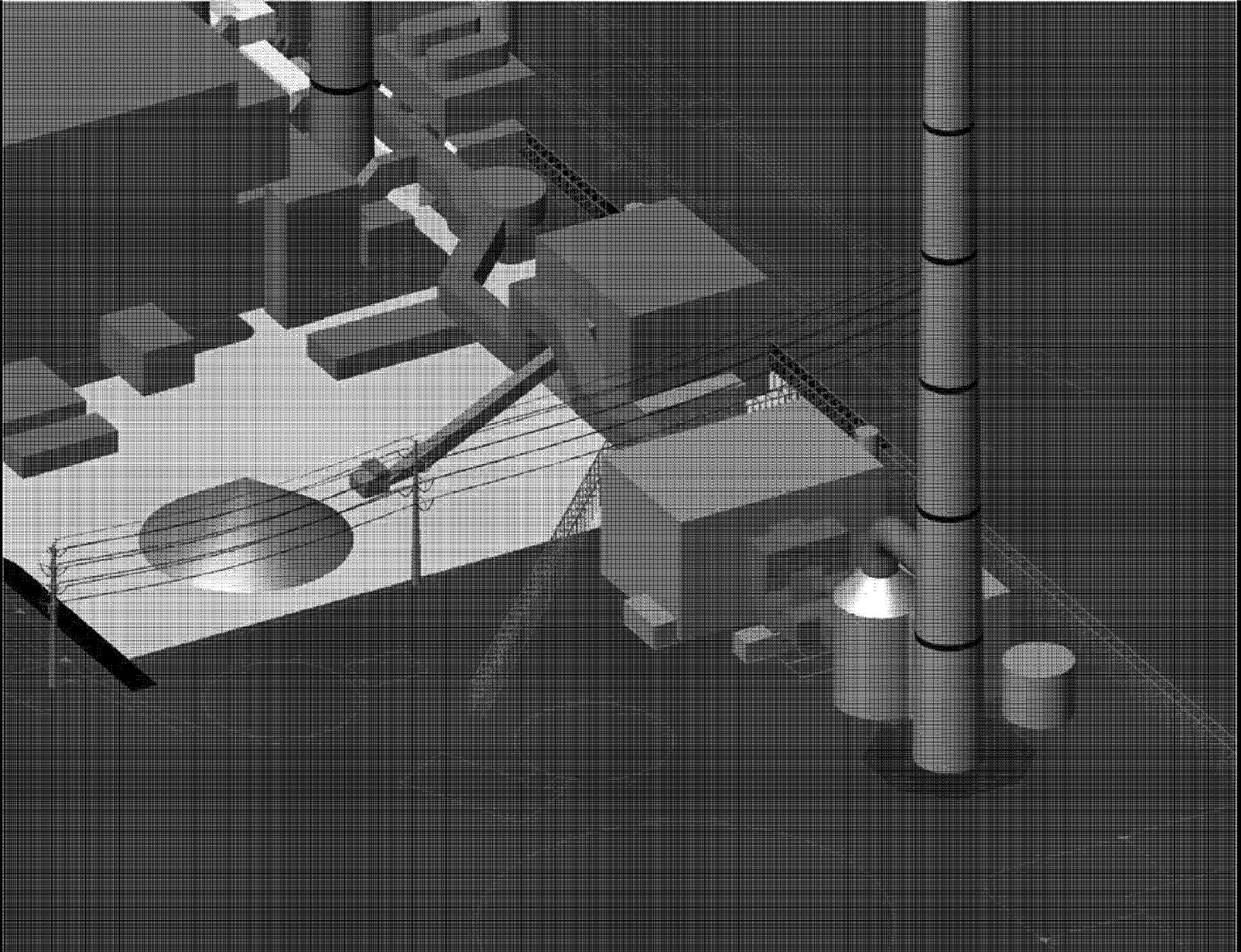
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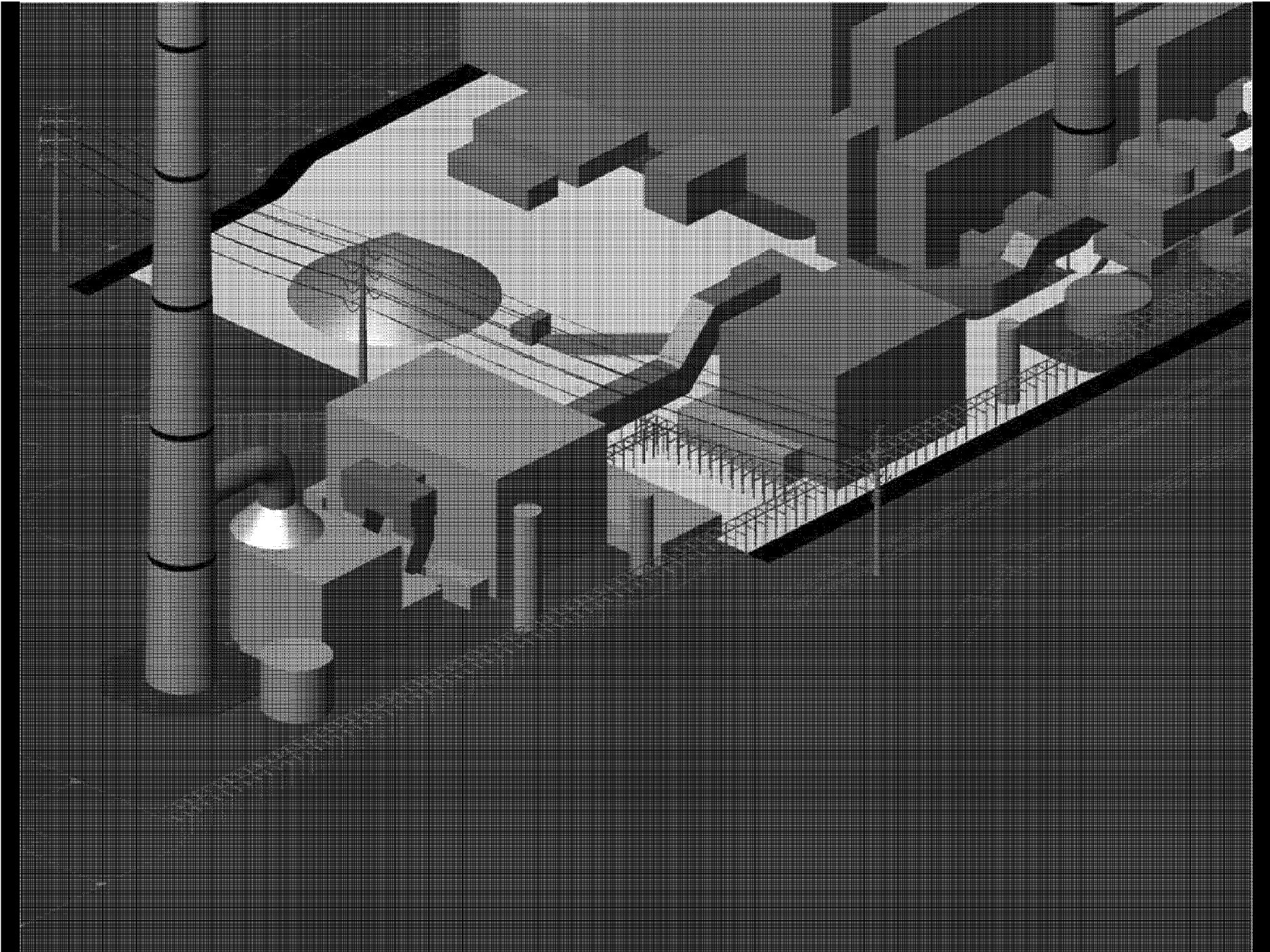


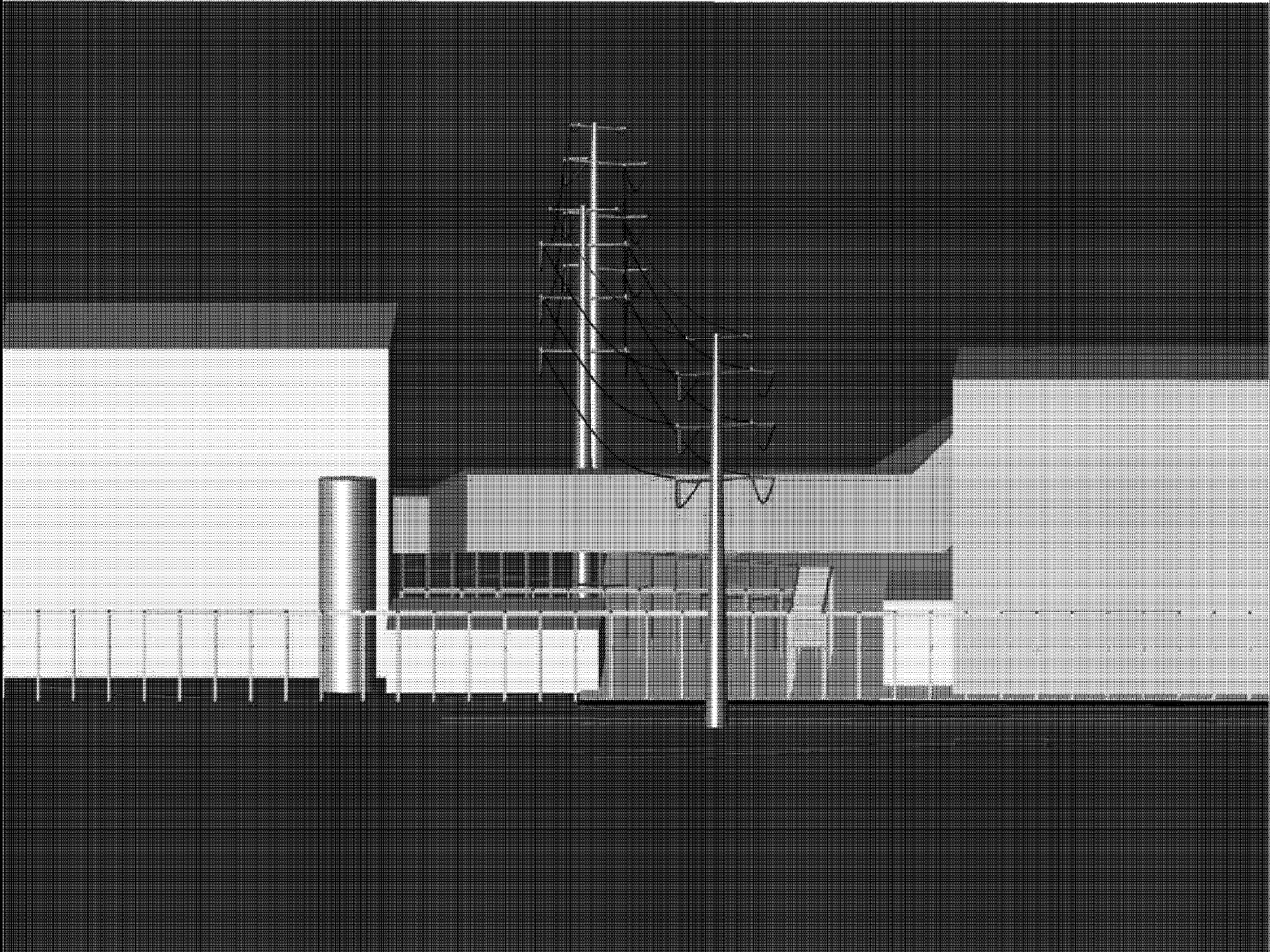
BLACK & VEATCH

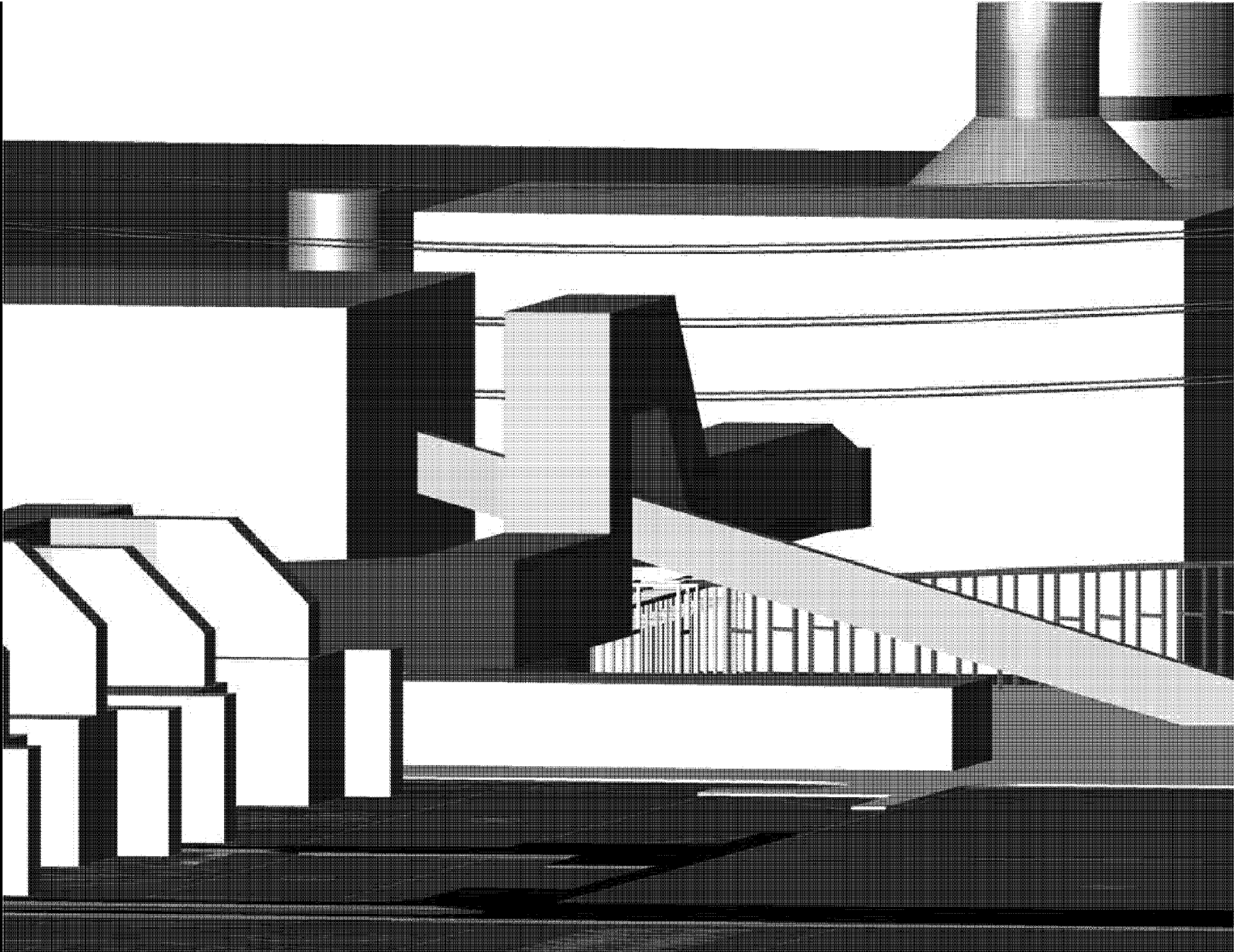
Unit 3 and 4 3-D Model Arrangement A

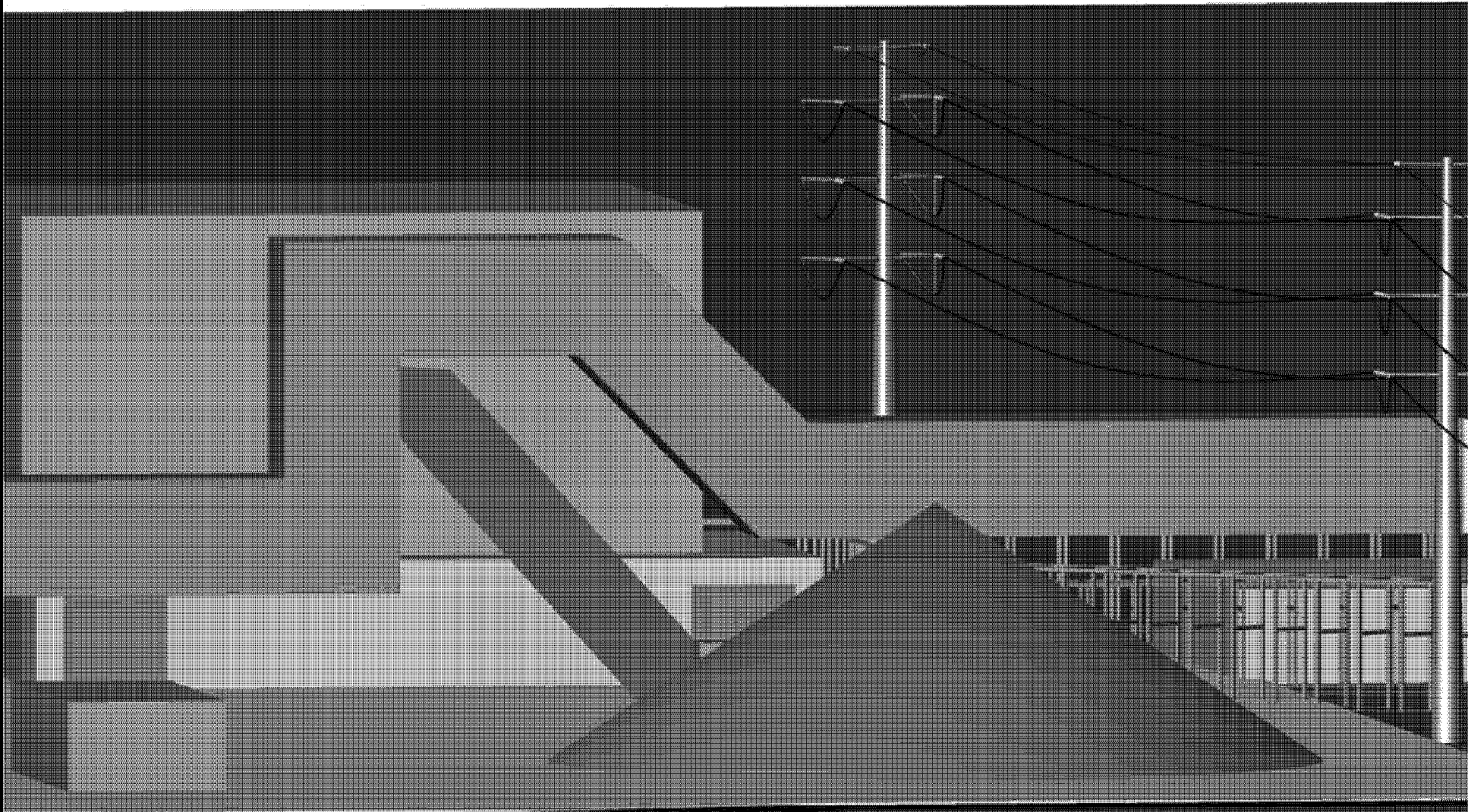










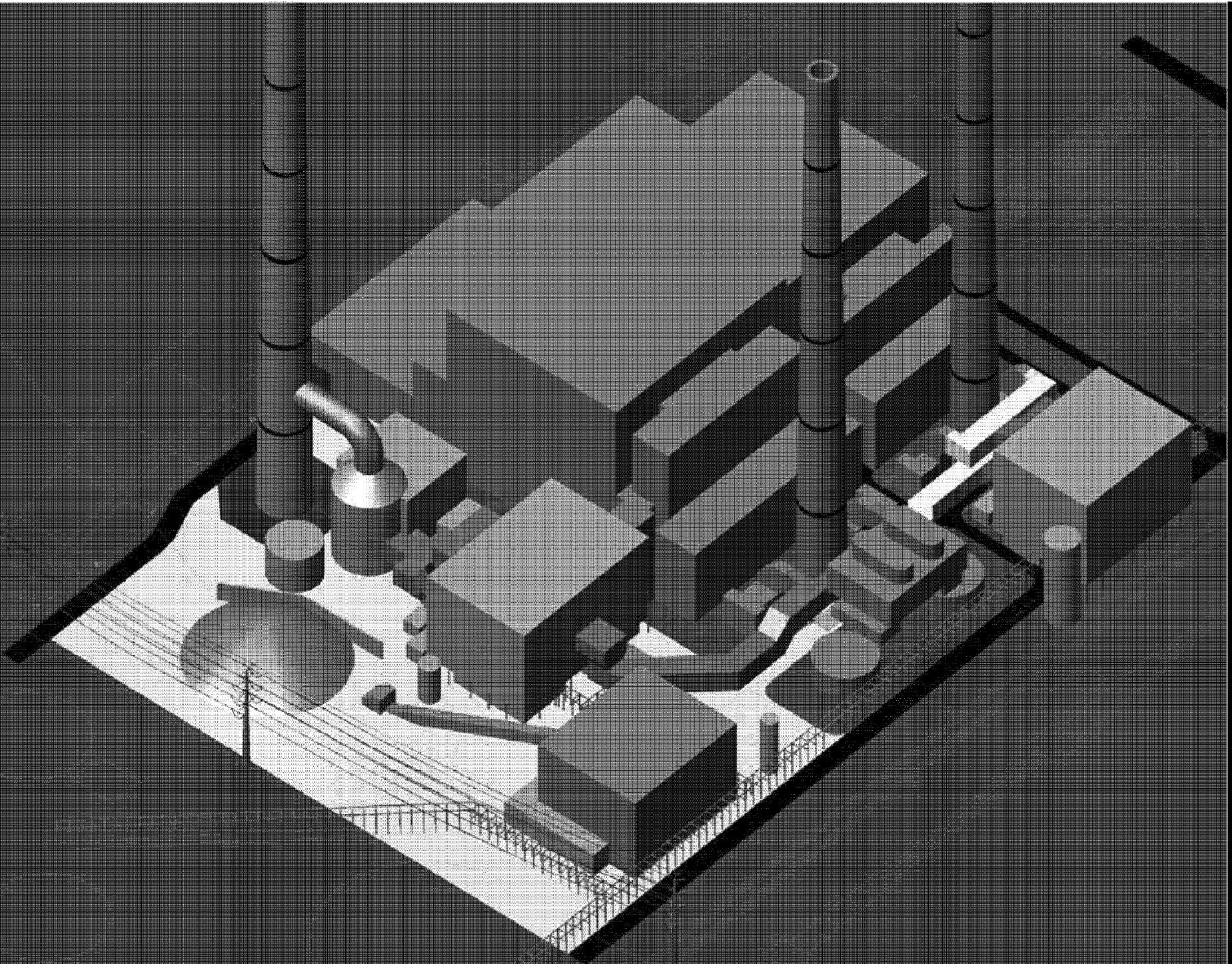


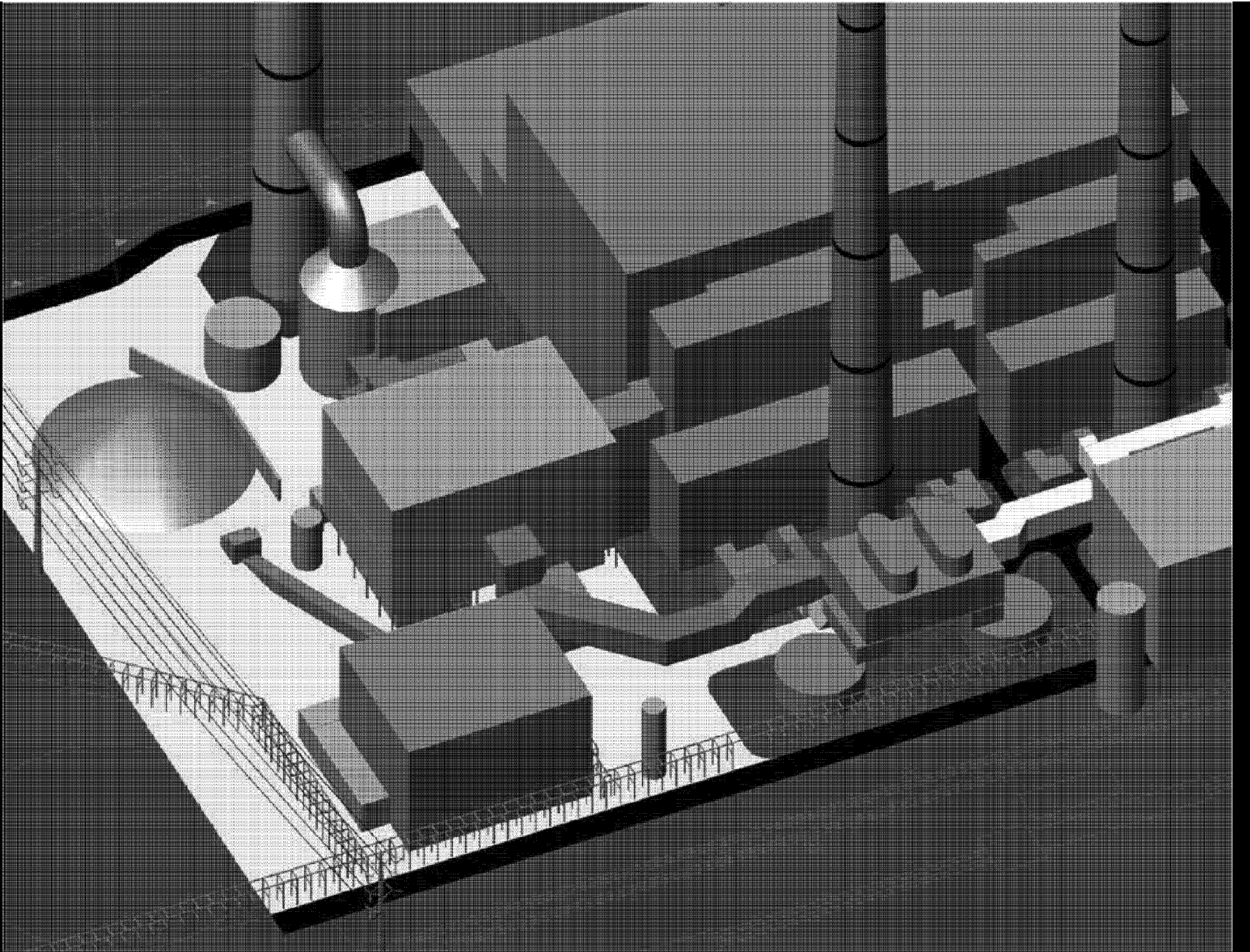
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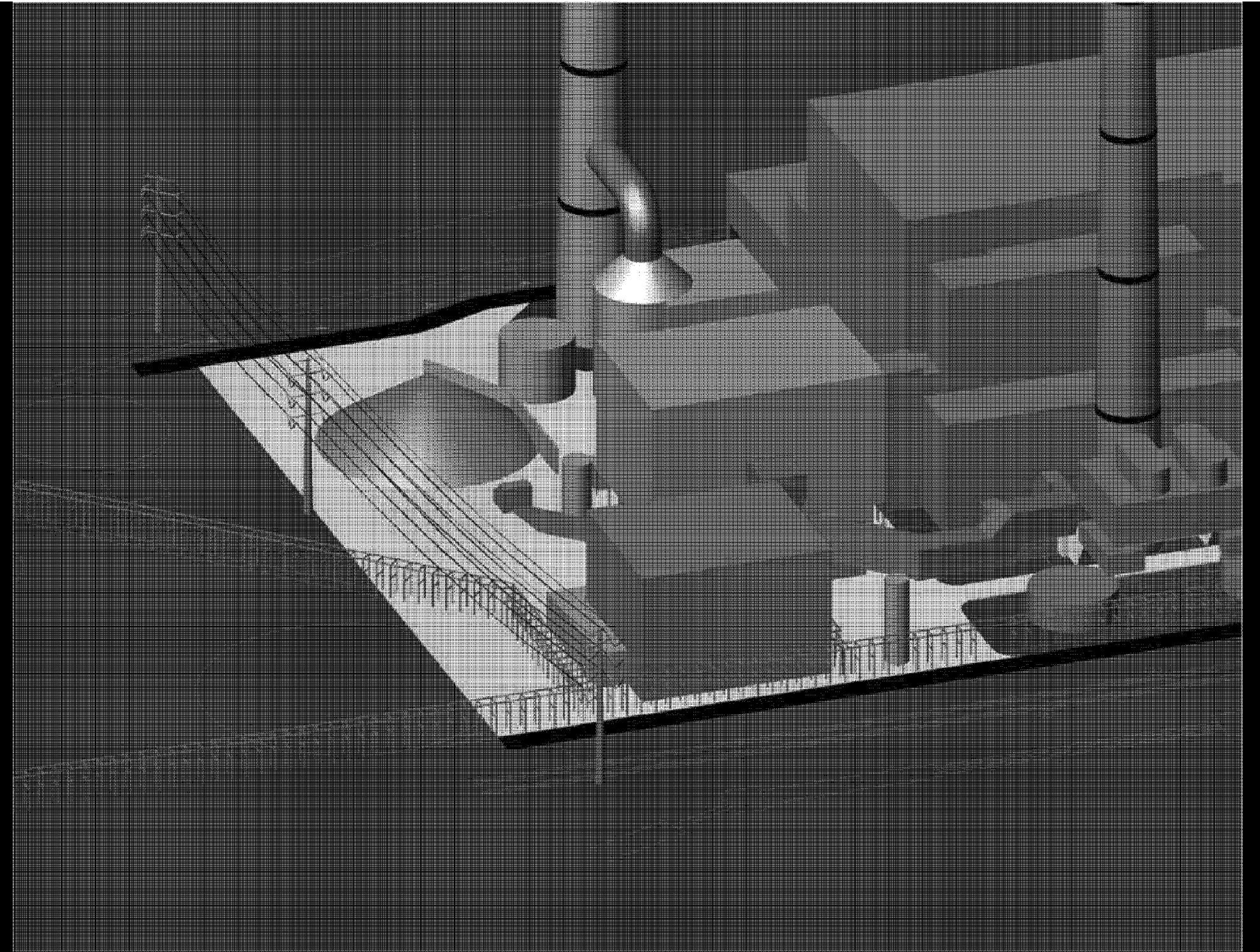


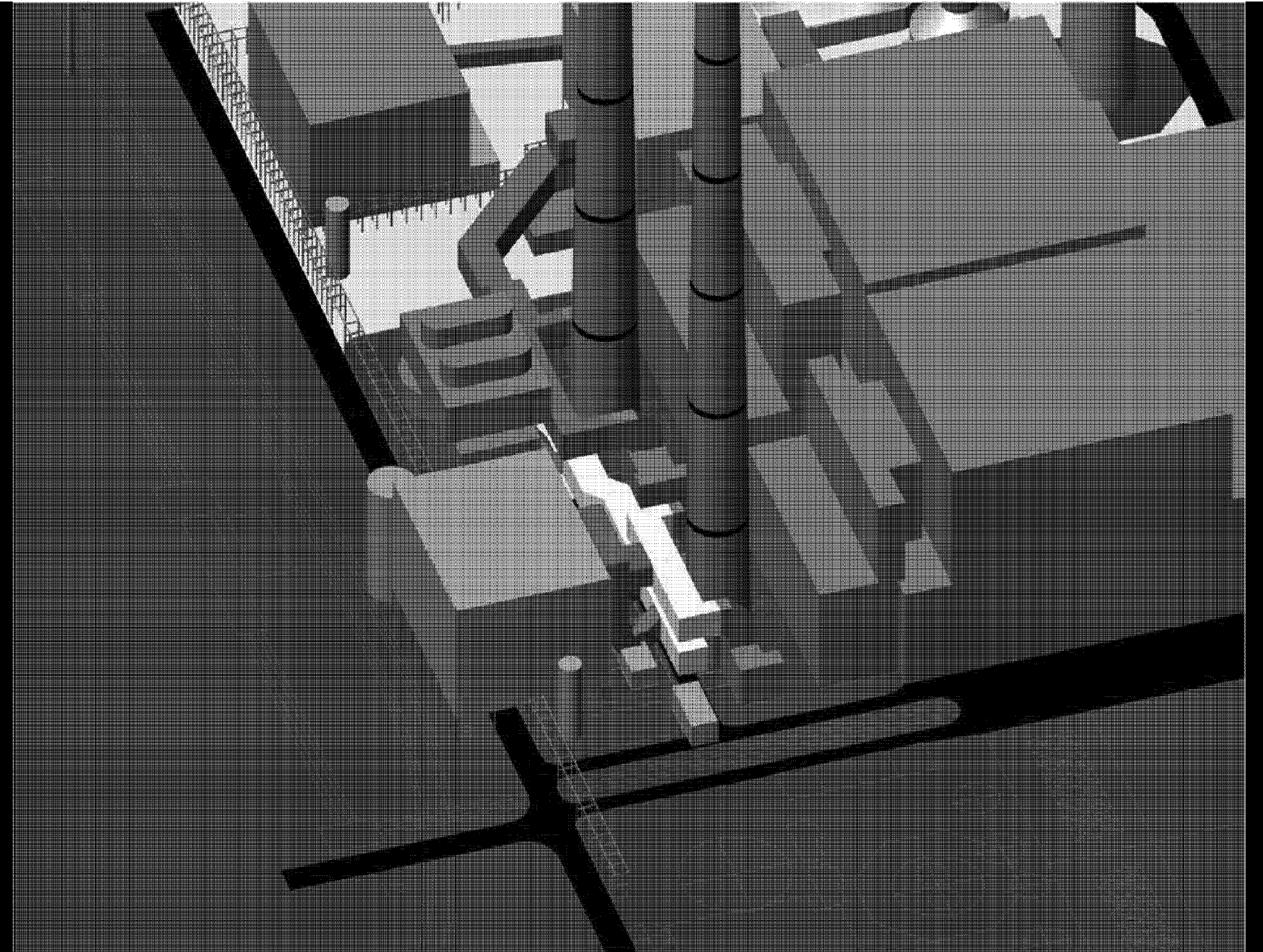
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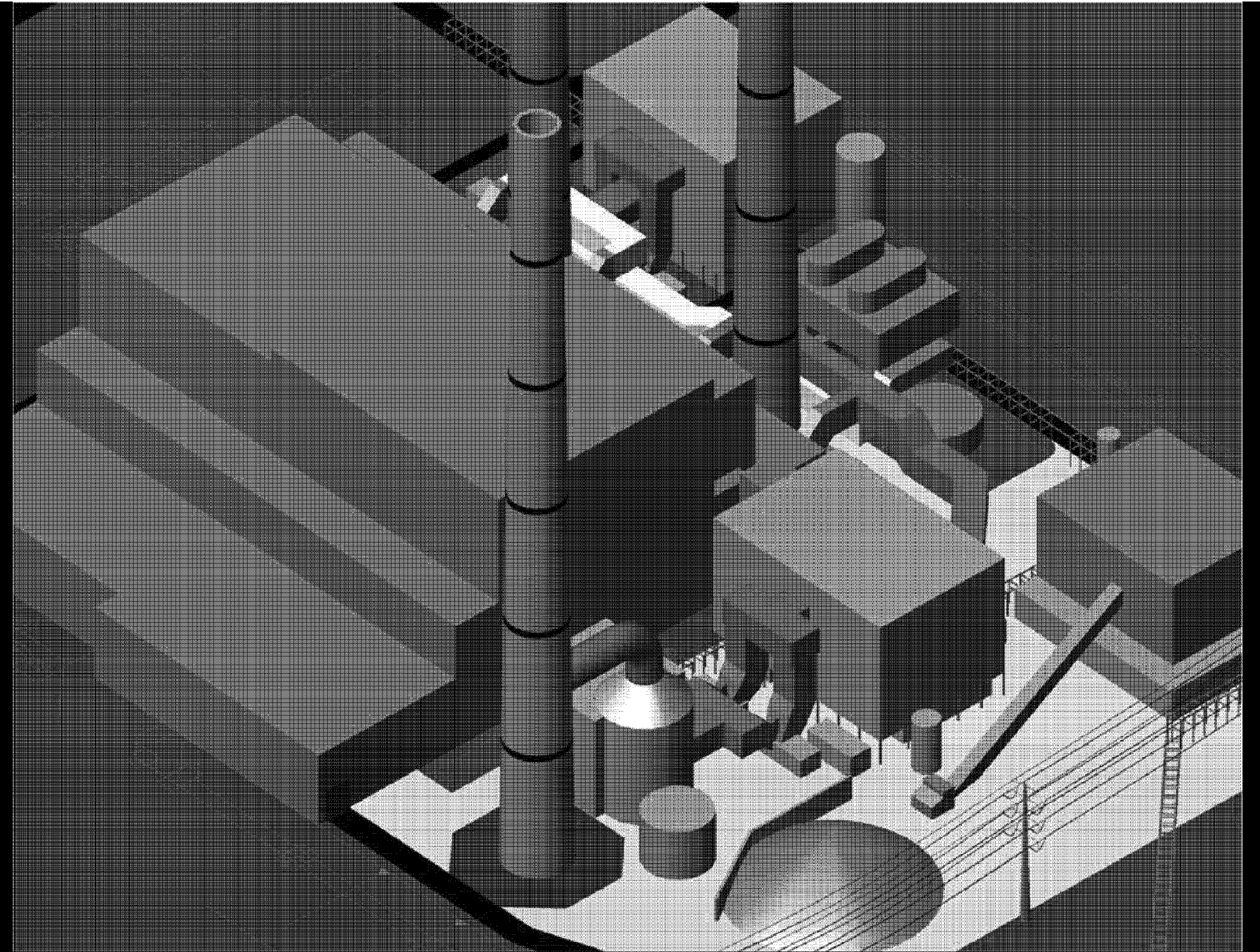
Unit 3 and 4 3-D Model Arrangement B











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PJFF- sorbent inj. / NID technology comparison



PJFF- sorbent inj. / NID technology comparison

Factor	PJFF w/ sorbent injection	NID
Equipment Cost	Lower	Higher
Footprint	Smaller	Larger
Reagent Cost	Higher	Lower
Auxiliary Power	Lower	Higher
Pressure Drop	Lower	Higher



PJFF- sorbent inj. / NID technology comparison

Factor	PJFF w/ sorbent injection	NID
Plugging Potential	N/A	Higher
Recycle	No	Yes
Maintenance	Lower	Higher
Water Injected	No	Yes
Inlet Temperature Limitations	None	< 350 F



PJFF- sorbent inj. / NID technology comparison

Factor	PJFF w/ sorbent injection	NID
HCl Removal	Lower	Higher
Co-Benefits: Waste Water Reduction	None	Higher
Experience	Good	Limited

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Summary / Wrap-up and Discussions

From: Schroeder, Andrea
To: Saunders, Eileen
Sent: 2/23/2011 1:35:02 PM
Subject: RE: 2011 ECR Plan - Mill Creek 4 Ammonia

Thanks - you're right, we did discuss. I didn't update my notes to reflect our conversation. I'll move the ammonia to the FGD project instead of with the Air Compliance. Thanks again!

From: Saunders, Eileen
Sent: Wednesday, February 23, 2011 1:14 PM
To: Schroeder, Andrea
Subject: RE: 2011 ECR Plan - Mill Creek 4 Ammonia

Andrea,

I believe we discussed this the last time we talked. The ammonia cost is a place holder for the cost to relocate the tank farm if we build the FGD in its current location. In our plan, the ammonia is a part of the Air Compliance Project but was never associated with the Baghouse. If you look on our spreadsheet, it is listed under MC 4 as a separate item. It should be discussed as part of the Mill Creek Unit 4 FGD project. If we end up putting the FGD in an alternate location, then this cost would either come out or be greatly reduced.

I hope that clarifies your question. If not, please feel free to contact me on 933-6558.

Thanks,

Eileen

From: Schroeder, Andrea
Sent: Wednesday, February 23, 2011 10:55 AM
To: Saunders, Eileen
Subject: 2011 ECR Plan - Mill Creek 4 Ammonia

Eileen,

In the context of the 2011 ECR Plan filing, were you able to clarify the need for ammonia on Unit 4? It is currently included as part of the overall Air Compliance project with the Baghouses. Is that where it should be or should it be with the Mill Creek FGD project?

Thanks,
Andrea

Andrea Schroeder
LG&E and KU
State Regulation and Rates
502-627-3651
502-627-3213 (fax)

From: Saunders, Eileen
To: Schroeder, Andrea
Sent: 2/23/2011 1:14:01 PM
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Andrea Schroeder
LG&E and KU
State Regulation and Rates
502-627-3651
502-627-3213 (fax)

From: Saunders, Eileen
To: Schroeder, Andrea
Sent: 2/23/2011 2:05:27 PM
Subject: RE: 2011 ECR Plan - Mill Creek 4 Ammonia

Andrea,

It is still a component of the Air Compliance impacts but not associated with the baghouses.

Thanks,

Eileen

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Andrea Schroeder
LG&E and KU
State Regulation and Rates
502-627-3651
502-627-3213 (fax)

From: Schroeder, Andrea
To: Saunders, Eileen
Sent: 2/23/2011 2:13:22 PM
Subject: RE: 2011 ECR Plan - Mill Creek 4 Ammonia

If we only incur the cost if the FGD is built in a certain location, why wouldn't we include it with the FGD project as a separately identified item - like the removal of the old MC3 FGD?

From: Saunders, Eileen
Sent: Wednesday, February 23, 2011 2:05 PM
To: Schroeder, Andrea
Subject: RE: 2011 ECR Plan - Mill Creek 4 Ammonia

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Andrea

Andrea Schroeder
LG&E and KU
State Regulation and Rates
502-627-3651
502-627-3213 (fax)

From: Schroeder, Andrea
To: Cosby, David
Sent: 4/15/2011 10:59:14 AM
Subject: ECR Project Dates-Regulations-Annual CapEx-V5.xlsx
Attachments: ECR Project Dates-Regulations-Annual CapEx-V5.xlsx

	A	B	C	D	E	G	H	I	J	K	L	M	N	O
1		Environmental Air Compliance By Month	Environmental Air - CATR by January 2014, NAAQS by January 2016, HAPs by January 2016											
2		From Revised Forecast (as of April 2011)												
3														
4			All Dates Linked to Month&Year Tab											
5	Project Number	Station / Technology	Regulatory Requirement	Rule to be Issued	Rule Compliance Required (Yes/No)	Engineering Cont.	Major Commitment	In-Service Date	Included in 2011 ECR Plan	Grand Total	2010 Total	2011 Total	2012 Total	
6														
7		Brown												
8														
9	KU-29	Brown Landfill (Phase I)	EPA CCR Regulation		NO					57,121,920.00	57,121,920.00	465,750.00	5,869,485.00	26,722,378.00
10														
11														
12	KU-34	Brown 1 - Baghouse/PAC Injection (Shared w/Brown 2)	HAPS	Nov 2011	Jan 2015	YES	3/1/2011	10/1/2011	5/31/2014	41,294,138.96	41,294,138.96	-	996,287.85	12,114,860.30
13	KU-34	Brown 1 - SAM Mitigation	PSD, Consent Decree			NO			5/31/2014	4,740,761.83	4,740,761.83	-	-	-
14	KU-34	Brown 2 - Baghouse/PAC Injection (Shared w/ Brown 1)	HAPS	Nov 2011	Jan 2015	YES	3/1/2011	10/1/2011	4/30/2014	42,312,226.94	42,312,226.94	-	1,001,200.54	12,433,732.86
15	KU-34	Brown 2 - SAM Mitigation	PSD, Consent Decree			NO			4/30/2014	4,740,761.83	4,740,761.83	-	-	-
16	KU-34	Brown 3 - Baghouse/PAC Injection	HAPS	Nov 2011	Jan 2015	YES	3/1/2011	10/1/2011	5/31/2015	80,499,275.30	80,499,275.30	-	-	1,487,219.69
17		Total Brown Project 24								173,587,164.84	173,587,164.84	-	1,997,488.40	26,035,812.85
18														
19														
20		Total Brown - Air Projects								173,587,164.84	173,587,164.84	-	1,997,488.40	26,035,812.85
21		Total Brown - CCR Projects								57,121,920.00	57,121,920.00	465,750.00	5,869,485.00	26,722,378.00
22														
23		TOTAL BROWN								230,709,084.84	230,709,084.84	465,750.00	7,866,973.40	52,758,190.85
24														
25		Ghent												
26														
27														
28	KU-35	Ghent 1 - Baghouse/PAC Injection	HAPS	Nov 2011	Jan 2015	YES	5/1/2011	3/1/2012	5/31/2014	147,685,097.83	147,685,097.83	-	684,416.59	45,554,768.12
29	KU-35	Ghent 1 - SAM Mitigation/SCR Turn-Down	CAIR, NSR, HAPS	Nov 2011	Jan 2015	NO		4/1/2011	5/31/2014	16,524,790.17	16,524,790.17	188,912.33	1,305,600.00	4,694,031.67
30	KU-35	Ghent 2 - Baghouse/PAC Injection	HAPS	Nov 2011	Jan 2015	YES	5/1/2011	3/1/2012	11/24/2014	156,808,048.52	156,808,048.52	-	-	29,751,614.19
31	KU-35	Ghent 2 - SAM Mitigation	NSR, HAPS	Nov 2011	Jan 2015	NO		4/1/2011	12/2/2012	8,160,027.32	8,160,027.32	26,384.12	122,400.00	7,603,243.20
32	KU-35	Ghent 3 - Baghouse/PAC Injection	HAPS	Nov 2011	Jan 2015	YES	5/1/2011	3/1/2012	10/31/2015	182,210,357.11	182,210,357.11	-	-	-
33	KU-35	Ghent 3 - SAM Mitigation/SCR Turn-Down	CATR, NSR, HAPS	Nov 2011	Jan 2015	NO		4/1/2011	11/30/2013	16,296,192.77	16,296,192.77	83,715.90	1,224,000.00	4,809,000.74
34	KU-35	Ghent 4 - Baghouse/PAC Injection	HAPS	Nov 2011	Jan 2015	YES	5/1/2011	3/1/2012	12/24/2015	168,586,561.96	168,586,561.96	-	-	-
35	KU-35	Ghent 4 - SAM Mitigation/SCR Turn-Down	CAIR, NSR, HAPS	Nov 2011	Jan 2015	NO		4/1/2011	3/31/2014	16,523,858.83	16,523,858.83	153,137.17	1,305,600.00	4,321,806.83
36		Total Ghent Project 35								712,794,934.50	712,794,934.50	452,149.52	4,642,016.59	96,734,464.75
37														
38		TOTAL GHENT								712,794,934.50	712,794,934.50	452,149.52	4,642,016.59	96,734,464.75
39														
40														
41		TOTAL KU AIR PROJECTS								886,382,099.35	886,382,099.35	452,149.52	6,639,504.99	122,770,277.60
42		TOTAL KU CCR PROJECTS								57,121,920.00	57,121,920.00	465,750.00	5,869,485.00	26,722,378.00
43														
44														
45		TOTAL KU PROJECTS								943,504,019.35	943,504,019.35	917,899.52	12,508,989.99	149,492,655.60
46														

	P	Q	R	S	T	U
1						
2						
3						
4						
5	2013 Total	2014 Total	2015 Total	2016 Total	2017 - 2031 Total	
6						
7						
8						
9	24,064,307.00	-	-	-	-	
10						
11						
12	17,407,141.38	10,775,849.42	-	-	-	
13	2,561,315.33	2,179,446.50	-	-	-	
14	17,835,975.42	11,041,318.12	-	-	-	
15	2,561,315.33	2,179,446.50	-	-	-	
16	19,333,855.91	34,584,401.45	25,093,798.26	-	-	
17	59,699,603.36	60,760,461.98	25,093,798.26	-	-	
18						
19						
20	59,699,603.36	60,760,461.98	25,093,798.26	-	-	
21	24,064,307.00					
22	-	-	-	-	-	
23	83,763,910.36	60,760,461.98	25,093,798.26	-	-	
24						
25						
26						
27						
28	62,182,258.48	39,263,654.64	-	-	-	
29						
29	4,742,333.49	5,593,912.68	-	-	-	
30	47,959,602.08	72,403,528.30	6,693,303.95	-	-	
31	408,000.00	-	-	-	-	
32	38,118,695.20	55,861,215.15	84,332,415.13	3,898,031.63	-	
33						
33	9,771,476.14	408,000.00	-	-	-	
34	30,351,112.08	51,501,044.92	77,749,964.60	8,984,440.35	-	
35						
35	4,765,617.01	5,977,697.81	-	-	-	
36	198,299,094.48	231,009,053.51	168,775,683.67	12,882,471.99	-	
37						
38	198,299,094.48	231,009,053.51	168,775,683.67	12,882,471.99	-	
39						
40						
41	257,998,697.84	291,769,515.49	193,869,481.93	12,882,471.99		
42	24,064,307.00	-	-	-	-	
43						
44						
45	282,063,004.84	291,769,515.49	193,869,481.93	12,882,471.99	-	
46						

	A	B	C	D	E	G	H	I	J	K	L	M	N	O
47														
48		Mill Creek												
49														
50	LGE-26	Mill Creek 1 - FGD Combined w/Unit 2	NAAQS, CATR	S issued; CATR Ju	CATR 2012, 2014	NO	6/1/2011	12/1/2011	5/31/2015	179,281,404.43	179,281,404.43	-	-	25,187,141.91
51	LGE-26	Mill Creek 1 - Baghouse/PAC Injection	HAPS	Nov 2011	Jan 2015	YES	12/31/2010	10/1/2011	5/31/2015	145,750,890.52	145,750,890.52	-	-	13,571,614.72
52	LGE-26	Mill Creek 1 - SAM Mitigation	HAPS	Nov 2011	Jan 2015	NO			5/31/2015	9,332,093.29	9,332,093.29	-	-	-
53	LGE-26	Mill Creek 2 - FGD Combined w/Unit 1	NAAQS, CATR	S issued; CATR Ju	CATR 2012, 2014	NO	6/30/2011	12/1/2011	4/30/2015	179,354,134.61	179,354,134.61	-	-	25,197,359.73
54	LGE-26	Mill Creek 2 - Baghouse/PAC Injection	HAPS	Nov 2011	Jan 2015	YES	12/31/2010	10/1/2011	4/30/2015	142,655,772.95	142,655,772.95	-	-	12,967,870.20
55	LGE-26	Mill Creek 2 - SAM Mitigation	HAPS	Nov 2011	Jan 2015	NO			4/30/2015	9,332,093.29	9,332,093.29	-	-	-
56	LGE-26	Mill Creek 3 - FGD (U4 upgrade and tie in)	NAAQS, CATR	S issued; CATR Ju	CATR 2012, 2014	YES	6/30/2011	12/1/2011	11/7/2014	72,845,258.23	72,845,258.23	-	-	6,892,460.61
57	LGE-26	Mill Creek 3 - Baghouse/PAC Injection.	HAPS	Nov 2011	Jan 2015	YES	12/31/2010	10/1/2011	10/13/2015	140,190,680.18	140,190,680.18	-	-	-
58	LGE-26	Mill Creek 3 - SCR Modification	CATR	Jun 2011		NO			4/12/2013	16,455,629.41	16,455,629.41	192,372.00	-	7,830,765.01
59	LGE-26	Mill Creek 4 - FGD	NAAQS, CATR	S issued; CATR Ju	CATR 2012, 2014	YES	1/1/2011	10/1/2011	11/1/2014	218,430,994.86	218,430,994.86	-	4,049,212.33	70,537,278.74
60	LGE-26	Mill Creek 4 - SCR Upgrade	CAIR	Jun 2011	CAIR 2012, 2014	NO	1/1/2011	10/1/2011	5/1/2012	5,606,250.00	5,606,250.00	-	1,121,250.00	4,485,000.00
61	LGE-26	Mill Creek 4 - Baghouse/PAC Injection	HAPS	Nov 2011	Jan 2015	YES	12/31/2010	10/1/2011	11/1/2014	151,642,805.25	151,642,805.25	-	4,027,967.13	49,934,720.93
62	LGE-26	Mill Creek 4 - SCR Modification	CATR	Jun 2011		NO			11/1/2014	17,213,845.26	17,213,845.26	227,628.00	-	-
63		Total Mill Creek Project 26								1,288,091,852.26	1,288,091,852.26	420,000.00	9,198,429.46	216,604,211.84
64														
65		TOTAL MILL CREEK								1,288,091,852.26	1,288,091,852.26	420,000.00	9,198,429.46	216,604,211.84
66														
67		Trimble												
68	LGE-27	Trimble 1 - Baghouse/PAC Injection	HAPS	Nov 2011	Jan 2015	YES	9/1/2012	6/1/2013	11/24/2015	123,752,357.16	123,752,357.16	-	-	-
69		TOTAL Trimble Unit 1								123,752,357.16	123,752,357.16	-	-	-
70														
71		TOTAL LG&E AIR PROJECTS								1,411,844,209.43	1,411,844,209.43	420,000.00	9,198,429.46	216,604,211.84
72														
73														
74														
75		TOTAL AIR PROJECTS								2,298,226,308.77	2,298,226,308.77	8/2,149.52	15,831,934.44	339,314,489.44
77														
78		TOTAL CCR PROJECTS								57,121,920.00	57,121,920.00	465,750.00	5,869,485.00	26,722,378.00
80														
81		TOTAL PROJECTS								2,355,348,228.77	2,355,348,228.77	1,337,899.52	21,707,419.44	366,096,867.44
82														
83														
84		NOTES:												
85		Numbers are prorated spreads based on the MTP which is by unit and not by technology. Study MTP based on does not meet level 1 engineering criteria.												
86		(1) In Service Dates are estimated based on current outage schedule.												
87														
88														
89														

	P	Q	R	S	T	U
47						
48						
49						
50	52,389,255.17	54,484,825.37	47,220,181.99	-	-	
51	42,343,437.92	44,037,175.43	45,798,662.45	-	-	
52	443,304.58	5,532,441.11	3,356,347.61	-	-	
53	52,410,508.23	54,506,928.56	47,239,338.09	-	-	
54	40,943,564.62	43,587,631.19	45,156,706.94	-	-	
55	443,304.58	5,532,441.11	3,356,347.61	-	-	
56	32,256,715.64	29,819,541.57	3,876,540.40	-	-	
57	39,814,878.00	49,061,558.11	43,768,429.79	7,545,814.27	-	
58	8,432,492.40	-	-	-	-	
59	87,592,561.07	44,409,428.46	11,842,514.26	-	-	
60	-	-	-	-	-	
61	54,678,073.14	34,781,306.50	8,220,737.54	-	-	
62	6,167,025.79	9,924,869.40	894,322.07	-	-	
63	417,915,121.13	375,678,146.82	260,730,128.74	7,545,814.27	-	
64						
65	417,915,121.13	375,678,146.82	260,730,128.74	7,545,814.27	-	
66						
67						
68	23,479,868.67	37,849,548.30	57,140,608.40	5,282,331.80	-	
69	23,479,868.67	37,849,548.30	57,140,608.40	5,282,331.80	-	
70						
71	441,394,989.80	413,527,695.12	317,870,737.14	12,828,146.07	-	
72						
73						
74						
75	699,393,687.65	705,297,210.61	511,740,219.06	25,710,618.06	-	
77						
78	24,064,307.00	-	-	-	-	
80						
81	723,457,994.65	705,297,210.61	511,740,219.06	25,710,618.06	-	
82						
83						
84						
85						
86						
87						
88						
89						

	A	B	C	D	E	G	H	I	J	K	L	M	N	O
90														
91														
92		Projects included in 2011 MTP - not included in 2011 ECR Plan												
93														
94		Brown 1 - SCR	CATR	Jun 2011	CATR 2012, 2014	YES	3/1/2011	10/1/2011	5/31/2014		68,325,024.79	-	3,175,379.99	19,814,370.38
95		Brown 2 - SCR	CATR	Jun 2011	CATR 2012, 2014	YES	3/1/2011	10/1/2011	11/30/2013		104,970,837.47	-	9,902,880.01	38,621,227.22
96		Brown Landfill (Future Phases)	Proposed EPA CCR I			NO					32,571,617.00	-	-	-
97		Total - Brown									173,295,862.27	-	13,078,260.00	58,435,597.60
98														
99		Ghent 2 - SCR	CATR	Jun 2011	CATR 2012, 2014	YES	5/1/2011	3/1/2012	4/30/2014		262,877,666.19	-	12,217,140.00	76,234,953.60
100		Total - Ghent									262,877,666.19	-	12,217,140.00	76,234,953.60
101														
102		Mill Creek 1 - SCR	CATR	Jun 2011	CATR 2012, 2014	YES	7/1/2011	3/1/2013	11/30/2016		122,586,367.80	-	-	-
103		Mill Creek 2 - SCR	CATR	Jun 2011	CATR 2012, 2014	YES	7/1/2011	3/1/2013	11/30/2015		117,871,507.29	-	-	3,258,288.63
104		Mill Creek 2 - Electrostatic Precipitator	CATR	Jun 2011	CATR 2012, 2014	NO	12/31/2010	10/1/2011	11/30/2013	37,689,527.49	37,689,527.49	-	3,552,120.00	12,929,716.79
105		Mill Creek 3 - FGD (Unit 3 Removal)	NAAQS, CATR	5 issued; CATR Ju	CATR 2012, 2014	YES				25,500,000.00	25,500,000.00	-	-	-
106		Total - Mill Creek									303,647,402.59	-	3,552,120.00	16,188,005.42
107														
108														
109		TOTAL KU - not included in 2011 ECR Plan									436,173,528.45	-	25,295,400.00	134,670,551.20
110		TOTAL LG&E - not included in 2011 ECR Plan									303,647,402.59	-	3,552,120.00	16,188,005.42
111														
112														
113		TOTAL ECR COMPLIANCE PROJECTS NOT IN 2011 ECR PLAN									739,820,931.04	-	28,847,520.00	150,858,556.62

	P	Q	R	S	T	U
90						
91						
92						
93						
94	27,475,921.21	17,859,353.21	-	-	-	
95	50,877,033.64	5,569,696.61	-	-	-	
96	-	-	-	-	32,571,617.00	
97	/8,352,954.85	23,429,049.82	-	-	-	
98						
99	105,712,467.71	68,713,104.88	-	-	-	
100	105,712,467.71	68,713,104.88	-	-	-	
101						
102	3,388,620.08	32,892,206.55	36,651,315.85	47,011,421.15	2,642,804.17	
103	31,627,121.31	35,241,649.84	45,203,289.61	2,541,157.91	-	
104	19,209,864.74	1,997,825.95	-	-	-	
105	-	6,375,000.00	19,125,000.00	-	-	
106	54,225,606.13	76,506,682.35	100,979,605.46	49,552,579.06	2,642,804.17	
107						
108						
109	184,065,422.55	92,142,154.70	-	-	-	
110	54,225,606.13	76,506,682.35	100,979,605.46	49,552,579.06	2,642,804.17	
111						
112						
113	238,291,028.68	168,648,837.05	100,979,605.46	49,552,579.06	2,642,804.17	

	A	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Environmental Air - CATR by January 2014, NAAQS by January 2016, HAPs by January 2016														
2	\$ in thousands														
3															
4	Removal Only	Outage Star	In Service		Removal Cost		Pre-2011	2011	2012	2013	2014	2015	2016	Total	
5															
6	Brown														
7	Brown 1 - Baghouse	Mar-14	May-14		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8	Brown 1 - SAM Mitigation	Mar-14	May-14		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
9	Total Brown 1				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
10															
11	Brown 2 - Baghouse	Mar-14	Apr-14		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
12	Brown 2 - SAM Mitigation	Mar-14	Apr-14		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
13	Total Brown 2				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
14															
15															
16	Brown 3 - Baghouse	Mar-15	May-15		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
17	Total Brown 3				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
18															
19	Total Brown				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20															
21	Ghent														
22	Ghent 1 - Baghouse	Mar-14	May-14		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23	Ghent 1 - SAM Mitigation/SCR Turn-Down	Mar-14	May-14		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	Total Ghent 1				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
25															
26	Ghent 2 - Baghouse	Oct-14	Nov-14		\$350		\$0	\$0	\$0	\$175	\$175	\$0	\$0	\$350	\$0
27	Ghent 2 - SAM Mitigation	Dec-12	Dec-12		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
28	Total Ghent 2				\$350		\$0	\$0	\$0	\$175	\$175	\$0	\$0	\$350	\$0
29															
30	Ghent 3 - Baghouse	Sep-15	Oct-15		\$400		\$0	\$0	\$0	\$0	\$175	\$225	\$0	\$400	\$0
31	Ghent 3 - SAM Mitigation/SCR Turn-Down	Oct-13	Nov-13		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
32	Total Ghent 3				\$400		\$0	\$0	\$0	\$0	\$175	\$225	\$0	\$400	\$0
33															
34	Ghent 4 - Baghouse	Oct-15	Dec-15		\$283		\$0	\$0	\$0	\$0	\$141	\$141	\$0	\$283	\$0
35	Ghent 4 - SAM Mitigation/SCR Turn-Down	Feb-14	Mar-14		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
36	Total Ghent 4				\$283		\$0	\$0	\$0	\$0	\$141	\$141	\$0	\$283	\$0
37															
38	Total Ghent				\$1,033		\$0	\$0	\$0	\$175	\$491	\$366	\$0	\$1,033	\$0
39															
40	Mill Creek														
41	Mill Creek 1 - Combined 1 & 2 FGD	Apr-15	May-15		\$2,000		\$0	\$0	\$0	\$0	\$0	#####	\$0	\$2,000	\$0
42	Mill Creek 1 - Baghouse	Apr-15	May-15		\$444		\$0	\$0	\$0	\$0	\$0	\$444	\$0	\$444	\$0
43	Mill Creek 1 - SAM Mitigation	Apr-15	May-15		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
44	Total Mill Creek 1				\$2,444		\$0	\$0	\$0	\$0	\$0	#####	\$0	\$2,444	\$0
45															
46	Mill Creek 2 - Combined 1& 2 FGD	Mar-15	Apr-15		\$2,000		\$0	\$0	\$0	\$0	\$0	#####	\$0	\$2,000	\$0
47	Mill Creek 2 - Baghouse	Mar-15	Apr-15		\$744		\$0	\$0	\$0	\$0	\$0	\$744	\$0	\$744	\$0
48	Mill Creek 2 - SAM Mitigation	Mar-15	Apr-15		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
49	Total Mill Creek 2				\$2,744		\$0	\$0	\$0	\$0	\$0	#####	\$0	\$2,744	\$0
50															
51															
52															
53	Mill Creek 3 - FGD (U4 update and tie in)	Sep-14	Nov-14		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
54	Mill Creek 3 - FGD (Unit 3 Removal)				\$1,383		\$0	\$0	\$0	\$0	\$0	#####	\$0	\$1,383	\$0
55	Mill Creek 3 - Baghouse	Sep-15	Oct-15		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
56	Mill Creek 3 - SAM Mitigation/SCR Turn-Down	Mar-13	Apr-13		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Draft

	A	C	D	E	F	G	H	I	J	K	L	M	N	O	P
57	Total Mill Creek 3				\$1,383		\$0	\$0	\$0	\$0	\$0	#####	\$0	\$1,383	\$0
58															
59	Mill Creek 4 - FGD	Sep-14	Nov-14		\$100		\$0	\$0	\$0	\$0	\$100	\$0	\$0	\$100	\$0
60	Mill Creek 4 - SCR Upgrade	Apr-12	May-12		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
61	Mill Creek 4 - Baghouse	Sep-14	Nov-14		\$360		\$0	\$0	\$0	\$0	\$360	\$0	\$0	\$360	\$0
62	Mill Creek 4 - SAM Mitigation/SCR Turn-Down	Oct-14	Nov-14		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
63	Total Mill Creek 4				\$460		\$0	\$0	\$0	\$0	\$460	\$0	\$0	\$460	\$0
64															
65	Total Mill Creek				\$7,031		\$0	\$0	\$0	\$0	\$460	#####	\$0	\$7,031	\$0
66															
67	Trimble (Net)														
68	Trimble 1 - Baghouse (Net)	Oct-15	Nov-15		\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
69	Total Trimble 1 (Net)				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
70															
71	Total Trimble (Net)				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
72															
73	Environmental Air Studies														
74	LG&E				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
75	KU				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
76	Total Environmental Air Studies				\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
77															
78	Total Environmental Compliance Air				\$8,064		\$0	\$0	\$0	\$175	\$951	#####	\$0	\$8,064	\$0
79															
80	Notes:														
81	*Costs for the Mill Creek 1 & 2 Combined FGD are based on a Black & Veatch budgetary estimate of \$1M per unit, doubled to cover costs to bring each unit to grade level.														

	A	B	C	D	E	F
1	Environmental Air - CATR by January 2014, NAAQS by January 2016, HAPs by January 2016					
2	\$ in thousands					
3						
4	O&M Only		Fixed O&M	Variable O&M	Total O&M	
5						
6	Brown					
7	Brown 1 - Baghouse		\$1,351	\$740	\$2,091	¹
8	Brown 1 - SAM Mitigation				\$0	²
9	Total Brown 1		\$1,351	\$740	\$2,091	
10						
11	Brown 2 - Baghouse		\$1,698	\$1,351	\$3,049	¹
12	Brown 2 - SAM Mitigation				\$0	²
13	Total Brown 2		\$1,698	\$1,351	\$3,049	
14						
15	Brown 3 - Baghouse		2,053	3,598	\$5,651	¹
16	Total Brown 3		\$2,053	\$3,598	\$5,651	
17						
18	Total Brown		\$5,102	\$5,689	\$10,791	
19						
20	Ghent					
21	Ghent 1 - Baghouse		\$361	\$11,917	\$12,277	
22	Ghent 1 - SAM Mitigation/SCR Turn-Down				\$0	²
23	Total Ghent 1		\$361	\$11,917	\$12,277	
24						
25	Ghent 2 - Baghouse		\$411	\$14,754	\$15,165	
26	Ghent 2 - SAM Mitigation				\$0	²
27	Total Ghent 2		\$411	\$14,754	\$15,165	
28						
29	Ghent 3 - Baghouse		\$340	\$12,194	\$12,533	
30	Ghent 3 - SAM Mitigation/SCR Turn-Down				\$0	²
31	Total Ghent 3		\$340	\$12,194	\$12,533	
32						
33	Ghent 4 - Baghouse		\$311	\$10,447	\$10,758	
34	Ghent 4 - SAM Mitigation/SCR Turn-Down				\$0	²
35	Total Ghent 4		\$311	\$10,447	\$10,758	
36						
37	Total Ghent		\$1,421	\$49,312	\$50,733	
38						
39	Mill Creek					
40	Mill Creek 1 - Combined 1 & 2 FGD		\$0	\$0	\$0	²
41	Mill Creek 1 - Baghouse		\$404	\$8,350	\$8,754	
42	Mill Creek 1 - SAM Mitigation				\$0	²
43	Total Mill Creek 1		\$404	\$8,350	\$8,754	
44						
45	Mill Creek 2 - Combined 1& 2 FGD		\$0	\$0	\$0	²
46	Mill Creek 2 - Baghouse		\$404	\$8,838	\$9,242	

	A	B	C	D	E	F
47	Mill Creek 2 - SAM Mitigation				\$0	²
48	Total Mill Creek 2		\$404	\$8,838	\$9,242	
49						
50	Mill Creek 3 - FGD (U4 update and tie in)			\$598	\$598	
51	Mill Creek 3 - Baghouse		\$425	\$11,860	\$12,285	
52	Mill Creek 3 - SAM Mitigation/SCR Turn-Down				\$0	²
53	Total Mill Creek 3		\$425	\$12,458	\$12,883	
54						
55	Mill Creek 4 - FGD		\$0	\$1,543	\$1,543	
56	Mill Creek 4 - Baghouse		\$476	\$13,946	\$14,422	
57	Mill Creek 4 - SAM Mitigation/SCR Turn-Down				\$0	²
58	Total Mill Creek 4		\$476	\$15,489	\$15,965	
59						
60	Total Mill Creek		\$1,709	\$45,135	\$46,844	
61						
62	Trimble (Net)					
63	Trimble 1 - Baghouse (Net)		\$3,069	\$4,577	\$7,646	¹
64	Total Trimble 1 (Net)		\$4,778	\$49,712	\$54,490	
65						
66	Total Trimble (Net)		\$4,778	\$49,712	\$54,490	
67						
68						
69	Grand Total O&M		\$13,010	\$149,849	\$162,859	
70						
71						
72			Notes ¹ O&M based on high level B&V Phase I studies			
73			² O&M costs need. to reference current MTP figures			
74			³ O&M costs include Aux Power. Until new B&V reports are			
75						
76						
77						

From: Sturgeon, Allyson </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=N093308>
Sent: 4/19/2011 2:53:46 PM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Schram, Chuck <Chuck.Schram@lge-ku.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; 'Kendrick Riggs' <kendrick.riggs@skofirm.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Charnas, Shannon <Shannon.Charnas@lge-ku.com>; Revlett, Gary <Gary.Revlett@lge-ku.com>; Voyles, John <John.Voyles@lge-ku.com>; Straight, Scott <Scott.Straight@lge-ku.com>; Saunders, Eileen <Eileen.Saunders@lge-ku.com>; Wilson, Stuart <Stuart.Wilson@lge-ku.com>; Winkler, Michael <Michael.Winkler@lge-ku.com>; Ehrler, Bob <Bob.Ehrler@lge-ku.com>
Subject: Copy: General Comments/Discussion on First Draft of ECR Applications and Testimony
Location: LGEC12 North 2 (Cap 15)
Start: Tue 4/26/2011 9:00:00 AM
End: Tue 4/26/2011 10:00:00 AM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; Schroeder, Andrea; Schram, Chuck; Conroy, Robert; 'Kendrick Riggs'; Bellar, Lonnie; Charnas, Shannon; Revlett, Gary; Voyles, John; Straight, Scott; Saunders, Eileen; Wilson, Stuart; Winkler, Michael; Ehrler, Bob

I realize that not everyone is available, but if you can make it, please try to do so. Thanks.

From: Walters, Kim </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=E010358>
Sent: 4/20/2011 7:49:19 AM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; 'Riggs, Kendrick R.' <kendrick.riggs@skofirm.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; LGEC12 West 1201 (Cap 20) <LGEC12West1201Cap20@lge-ku.com>
Subject: Copy: ECR Testimony Review-Robert Conroy
Location: LGEC 1201
Start: Mon 5/9/2011 1:30:00 PM
End: Mon 5/9/2011 3:00:00 PM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; 'Riggs, Kendrick R.'; Conroy, Robert; Schroeder, Andrea; Bellar, Lonnie; LGEC12 West 1201 (Cap 20)

From: Walters, Kim </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=E010358>
Sent: 4/20/2011 7:52:00 AM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; 'Riggs, Kendrick R.' <kendrick.riggs@skofirm.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Voyles, John <John.Voyles@lge-ku.com>; LGEC12 West 1201 (Cap 20) <LGEC12West1201Cap20@lge-ku.com>; Straight, Scott <Scott.Straight@lge-ku.com>; Saunders, Eileen <Eileen.Saunders@lge-ku.com>
Subject: Copy: ECR Testimony Review-Voyles
Location: LGEC 1201
Start: Tue 5/10/2011 1:30:00 PM
End: Tue 5/10/2011 3:00:00 PM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; 'Riggs, Kendrick R.'; Conroy, Robert; Schroeder, Andrea; Bellar, Lonnie; Voyles, John; LGEC12 West 1201 (Cap 20); Straight, Scott; Saunders, Eileen

From: Walters, Kim </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=E010358>
Sent: 4/20/2011 8:03:41 AM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; 'Riggs, Kendrick R.' <kendrick.riggs@skofirm.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Revlett, Gary <Gary.Revlett@lge-ku.com>; LGEC12 West 1201 (Cap 20) <LGEC12West1201Cap20@lge-ku.com>
Subject: Copy: ECR Testimony Review-Revlett
Location: LGEC1201
Start: Fri 5/13/2011 2:00:00 PM
End: Fri 5/13/2011 3:30:00 PM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; 'Riggs, Kendrick R.'; Conroy, Robert; Schroeder, Andrea; Bellar, Lonnie; Revlett, Gary; LGEC12 West 1201 (Cap 20)

From: Ritchey, Stacy
To: Schroeder, Andrea
Sent: 4/20/2011 3:00:36 PM
Subject: RE: Revised Environmental Air Compliance Estimates for Gen Planning

Andrea,

No the file does not include the partners share, the numbers are Net of the partner share.

Thanks,

Stacy

From: Schroeder, Andrea
Sent: Wednesday, April 20, 2011 2:57 PM
To: Ritchey, Stacy
Subject: FW: Revised Environmental Air Compliance Estimates for Gen Planning

Stacy,

For the baghouse at TC1, do you know if the capital dollars in the attached file include the IMEA/IMPA partner share? In the ECR filing application, we state the total estimated cost to build and make the point of the 25% partner share that results in the LG&E share of costs. There is no need to change the attachment - I just need to confirm what is or is not in that cost estimate.

Thanks,
Andrea
X3651

From: Cosby, David
Sent: Monday, April 18, 2011 4:50 PM
To: Schroeder, Andrea
Cc: Saunders, Eileen; Ritchey, Stacy; Wilson, Stuart; Karavayev, Louanne; Mooney, Mike (BOC 3); Straight, Scott; Hudson, Rusty
Subject: RE: Revised Environmental Air Compliance Estimates for Gen Planning

Andrea,

As we discussed for your requested breakdown earlier, here is a file that represents the O&M and OCOS (Other Cost of Sales) amounts for the environmental systems based off of the most recent versions of B&V data provided and 2011 MTP/LTP information for other specific systems referenced. I met with Eileen, Stacy and Mike and we have exchanged information on what we have as the most updated versions of timeline and cost estimate information from B&V and Project Engineering. Please review the attached document and the tabs included. Here are a few summary items to note:

- The first tab "Summary By Year and Unit" is the current primary file. It includes costs for 2012-2021 for all of the systems listed on the current view found on tab 2 - "O&M New Env Air".
- The third tab "Plant MTP Based Costs" includes estimates for those items that are based off 2011 MTP/LTP amounts and not included as part of the tab 2 amounts.
- The all in costs for both tabs is \$137M which is the \$117M on the B&V list plus the \$20M on the plant based MTP list.
- The fourth tab "2011 Official LTP B&V Phase 1" is what we had in the final LTP for years 2014-2020 based

off of the B&V numbers provided last year.

- Please note that I am excluding Aux Power Costs provided by B&V because they are not tracked at the plant level as a cost. There is \$10M of costs there. PE is sharing the MWH information with Gen Planning for the aux power usage.
- Within the primary tab "Summary By Year and Unit" you can see the expected in-service timing of the systems in column A. This drives the timing of when the incremental costs start. Everything is all-in for January 2016 at an escalated level of \$140M. This compares to last year's higher number of more than \$170M.
- The escalation rate used is 2% as was done for the LTP last year.
- The majority of the estimates are based off of the B&V provided information. Ghent and Mill Creek data has been updated in some cases in newer versions. The TC1 and Brown information still relies heavily off of last year's data.

Please take a look at the file and information therein and let me know if you have any questions. Thanks.

<< File: Env Air Summary O&M OCOS 4-18-11.xlsx >>

David L. Cosby Jr.

Manager - Fin. & Budgeting - Power Generation

LG&E and KU Energy Services

502-627-2499

david.cosby@lge-ku.com

From: Schroeder, Andrea
Sent: Wednesday, April 13, 2011 10:33 AM
To: Cosby, David
Cc: Saunders, Eileen; Ritchey, Stacy
Subject: FW: Revised Environmental Air Compliance Estimates for Gen Planning

David,

The attached file contains O&M associated with the projects in the 2011 ECR Plan filing. To calculate the bill impact of the Plan, I need the annual O&M for 2011 through 2020 for the projects to be included. If it is not available, I need to know what year the O&M in the attached file represents and an escalation factor for the years following years.

If possible, I need the information no later than Tuesday, April 19.

Thanks
Andrea
X3651

From: Saunders, Eileen
Sent: Wednesday, April 13, 2011 9:47 AM
To: Wilson, Stuart; Karavayev, Louanne
Cc: Straight, Scott; Hudson, Rusty; Schroeder, Andrea; Cosby, David; Ritchey, Stacy; Mooney, Mike (BOC 3)
Subject: FW: Revised Environmental Air Compliance Estimates for Gen Planning

All,

Please see the updated spreadsheet. As described below, we updated the Removal tab to include escalation.

Thank you,

Eileen

From: Ritchey, Stacy

Sent: Wednesday, April 13, 2011 9:43 AM

To: Saunders, Eileen

Subject: Revised Environmental Air Compliance Estimates for Gen Planning

Eileen,

Per our conversation with Andrea this morning I have updated the removal tab to show escalated values for removal.

<< File: Environmental Air Summary Gen Planning 4-13-11.xlsx >>

Thanks,

Stacy Ritchey

Sr Budget Analyst

Project Engineering

BOC Phone: (502) 627-4388

EW Brown Phone (859) 748-4455

Fax: (502) 217-4980

From: Schroeder, Andrea
To: Ritchey, Stacy
Sent: 4/20/2011 3:02:34 PM
Subject: RE: Revised Environmental Air Compliance Estimates for Gen Planning

That's what I was hoping you'd say. Thanks for the quick response.

From: Ritchey, Stacy
Sent: Wednesday, April 20, 2011 3:01 PM
To: Schroeder, Andrea
Subject: RE: Revised Environmental Air Compliance Estimates for Gen Planning

Andrea,

No the file does not include the partners share, the numbers are Net of the partner share.

Thanks,

Stacy

From: Schroeder, Andrea
Sent: Wednesday, April 20, 2011 2:57 PM
To: Ritchey, Stacy
Subject: FW: Revised Environmental Air Compliance Estimates for Gen Planning

Stacy,

For the baghouse at TC1, do you know if the capital dollars in the attached file include the IMEA/IMPA partner share? In the ECR filing application, we state the total estimated cost to build and make the point of the 25% partner share that results in the LG&E share of costs. There is no need to change the attachment - I just need to confirm what is or is not in that cost estimate.

Thanks,
Andrea
X3651

From: Cosby, David
Sent: Monday, April 18, 2011 4:50 PM
To: Schroeder, Andrea
Cc: Saunders, Eileen; Ritchey, Stacy; Wilson, Stuart; Karavayev, Louanne; Mooney, Mike (BOC 3); Straight, Scott; Hudson, Rusty
Subject: RE: Revised Environmental Air Compliance Estimates for Gen Planning

Andrea,

As we discussed for your requested breakdown earlier, here is a file that represents the O&M and OCOS (Other Cost of Sales) amounts for the environmental systems based off of the most recent versions of B&V data provided and 2011 MTP/LTP information for other specific systems referenced. I met with Eileen, Stacy and Mike and we have exchanged information on what we have as the most updated versions of timeline and cost estimate information from B&V and Project Engineering. Please review the attached document and the tabs included. Here are a few summary items to note:

- The first tab "Summary By Year and Unit" is the current primary file. It includes costs for 2012-2021 for all of the systems listed on the current view found on tab 2 - "O&M New Env Air".
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- The fourth tab "2011 Official LTP B&V Phase 1" is what we had in the final LTP for years 2014-2020 based off of the B&V numbers provided last year.
- Please note that I am excluding Aux Power Costs provided by B&V because they are not tracked at the plant level as a cost. There is \$10M of costs there. PE is sharing the MWH information with Gen Planning for the aux power usage.
- Within the primary tab "Summary By Year and Unit" you can see the expected in-service timing of the systems in column A. This drives the timing of when the incremental costs start. Everything is all-in for January 2016 at an escalated level of \$140M. This compares to last year's higher number of more than \$170M.
- The escalation rate used is 2% as was done for the LTP last year.
- The majority of the estimates are based off of the B&V provided information. Ghent and Mill Creek data has been updated in some cases in newer versions. The TC1 and Brown information still relies heavily off of last year's data.

Please take a look at the file and information therein and let me know if you have any questions. Thanks.

<< File: Env Air Summary O&M OCOS 4-18-11.xlsx >>

David L. Cosby Jr.

Manager - Fin. & Budgeting - Power Generation

LG&E and KU Energy Services

502-627-2499

david.cosby@lge-ku.com

From: Schroeder, Andrea

Sent: Wednesday, April 13, 2011 10:33 AM

To: Cosby, David

Cc: Saunders, Eileen; Ritchey, Stacy

Subject: FW: Revised Environmental Air Compliance Estimates for Gen Planning

David,

The attached file contains O&M associated with the projects in the 2011 ECR Plan filing. To calculate the bill impact of the Plan, I need the annual O&M for 2011 through 2020 for the projects to be included. If it is not available, I need to know what year the O&M in the attached file represents and an escalation factor for the years following years.

If possible, I need the information no later than Tuesday, April 19.

Thanks

Andrea

X3651

From: Saunders, Eileen

Sent: Wednesday, April 13, 2011 9:47 AM

To: Wilson, Stuart; Karavayev, Louanne

Cc: Straight, Scott; Hudson, Rusty; Schroeder, Andrea; Cosby, David; Ritchey, Stacy; Mooney, Mike (BOC 3)

Subject: FW: Revised Environmental Air Compliance Estimates for Gen Planning

All,

Please see the updated spreadsheet. As described below, we updated the Removal tab to include escalation.

Thank you,

Eileen

From: Ritchey, Stacy
Sent: Wednesday, April 13, 2011 9:43 AM
To: Saunders, Eileen
Subject: Revised Environmental Air Compliance Estimates for Gen Planning

Eileen,

Per our conversation with Andrea this morning I have updated the removal tab to show escalated values for removal.

<< File: Environmental Air Summary Gen Planning 4-13-11.xlsx >>

Thanks,

Stacy Ritchey
Sr Budget Analyst
Project Engineering
BOC Phone: (502) 627-4388
EW Brown Phone (859) 748-4455
Fax: (502) 217-4980

From: Schroeder, Andrea </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=E026206>
Sent: 4/21/2011 12:54:16 PM
To: Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Straight, Scott <Scott.Straight@lge-ku.com>; Saunders, Eileen <Eileen.Saunders@lge-ku.com>; Voyles, John <John.Voyles@lge-ku.com>; Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; Kendrick Riggs <kendrick.riggs@skofirm.com>; 'Crosby, W. Duncan' <duncan.crosby@skofirm.com>
Subject: Copy: Discuss supporting documents for Voyles ECR Testimony
Location: LGEC12 North 1 (Cap 15)
Start: Tue 5/3/2011 8:30:00 AM
End: Tue 5/3/2011 10:00:00 AM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Schroeder, Andrea; Conroy, Robert; Bellar, Lonnie; Straight, Scott; Saunders, Eileen; Voyles, John; Sturgeon, Allyson; Kendrick Riggs ; 'Crosby, W. Duncan'

The purpose of the meeting is to finalize the documents to be provided as support to John Voyles's testimony in the 2011 ECR Plan filings.

From: Schroeder, Andrea
To: Conroy, Robert; Bellar, Lonnie; Straight, Scott; Saunders, Eileen; Voyles, John; Sturgeon, Allyson; 'Kendrick Riggs '; 'Crosby, W. Duncan'
BCC: LGEC12 North 1 (Cap 15)
Sent: 4/27/2011 11:35:45 AM
Subject: Discuss supporting documents for Voyles ECR Testimony

When: Tuesday, May 03, 2011 8:30 AM-10:00 AM (GMT-05:00) Eastern Time (US & Canada).
Where: LGEC12 North 1 (Cap 15)

Note: The GMT offset above does not reflect daylight saving time adjustments.

~~*~*~*~*~*~*~*~*

The purpose of the meeting is to finalize the documents to be provided as support to John Voyles's testimony in the 2011 ECR Plan filings.

From: Bush, Howard
To: Schroeder, Andrea
Sent: 5/4/2011 9:17:50 AM
Subject: ECR

Andrea, I see no way to simplify the language without modifying the application. Unless I'm looking at ECR sheets that haven't been revised, I note a problem or two (actually 3)

ECR should be applied to these rates

KU LGE

RS RS

VFD VFD

GS GS

CPS There is no such rate

AES

PS PS

TODS CTODS

ITODS

TODP CTODP

ITODP

RTS RTS

FLS FLS

St Lt LS

PO Lt RLS

LE LE

TE TE

RRP Not listed but should be

GRP Not listed but should be

LEV LEV

FAC FAC

DSM DSM

Note : New E-Mail Address howard.bush@lge-ku.com

F. Howard Bush

Manager, Tariffs/Special Contracts

Tel - Lex (859) 367-5636 - Lou (502) 627-4136

Fax - Lex (859) 367-1312 - Lou (502) 627-3213

Mob - (502) 645- 2386

From: Schroeder, Andrea
To: Bush, Howard
Sent: 5/4/2011 10:14:28 AM
Subject: RE: ECR

I noticed those missing were missing. DSK is also missing from the rate schedules on the current tariff. I've got several edits to make to the tariffs and will get circulated in the next day or so.

From: Bush, Howard
Sent: Wednesday, May 04, 2011 9:18 AM
To: Schroeder, Andrea
Subject: ECR

Andrea, I see no way to simplify the language without modifying the application. Unless I'm looking at ECR sheets that haven't been revised, I note a problem or two (actually 3)

ECR should be applied to these rates

KU LGE

RS RS

VFD VFD

GS GS

CPS There is no such rate

AES

PS PS

TODS CTODS

ITODS

TODP CTODP

ITODP

RTS RTS

FLS FLS

St Lt LS

PO Lt RLS

LE LE

TE TE

RRP Not listed but should be

GRP Not listed but should be

LEV LEV

FAC FAC

DSM DSM

Note : New E-Mail Address howard.bush@lge-ku.com

F. Howard Bush

Manager, Tariffs/Special Contracts

Tel - Lex (859) 367-5636 - Lou (502) 627-4136

Fax - Lex (859) 367-1312 - Lou (502) 627-3213

Mob - (502) 645- 2386

From: Schroeder, Andrea
To: Saunders, Eileen
CC: Ritchey, Stacy; Imber, Philip; Straight, Scott
Sent: 5/5/2011 9:50:08 AM
Subject: RE: MC 3-4 Sorbent Injection Capital - 2006 ECR Plan

Thank you.

From: Saunders, Eileen
Sent: Thursday, May 05, 2011 9:48 AM
To: Schroeder, Andrea
Cc: Ritchey, Stacy; Imber, Philip; Straight, Scott
Subject: RE: MC 3-4 Sorbent Injection Capital - 2006 ECR Plan

Andrea,

Please see our response below and let us know if you have any questions.

Thanks,

Eileen

I have revised the MC 3 and 4 SAM Mitigation figures to exclude the costs related to technologies in the 2006 ECR filing. Per our conversation with Philip the remaining costs are for Mixing and Milling Technology or alternatively Wet Sorbent Injection.

<< File: Environmental Air Summary Gen Planning 5-5-11 .xlsx >>

Thanks,

Stacy Ritchey
Sr Budget Analyst
Project Engineering
BOC Phone: (502) 627-4388
EW Brown Phone (859) 748-4455
Fax: (502) 217-4980

From: Schroeder, Andrea
Sent: Wednesday, May 04, 2011 12:52 PM
To: Saunders, Eileen
Cc: Ritchey, Stacy
Subject: RE: MC 3-4 Sorbent Injection Capital - 2006 ECR Plan

I need it by noon tomorrow if at all possible.

From: Saunders, Eileen
Sent: Wednesday, May 04, 2011 11:50 AM
To: Schroeder, Andrea
Cc: Ritchey, Stacy

Subject: RE: MC 3-4 Sorbent Injection Capital - 2006 ECR Plan

Andrea,

Thank you. Stacy will get you something tomorrow as she has a Rusty activity this afternoon.

Thanks,

Eileen

From: Schroeder, Andrea
Sent: Wednesday, May 04, 2011 11:22 AM
To: Saunders, Eileen; Ritchey, Stacy
Subject: MC 3-4 Sorbent Injection Capital - 2006 ECR Plan

The estimated capital for the Sorbent Injection at Mill Creek from the 2006 ECR Plan is:

MC3 - \$6.43M to be spent in 2007

MC4 - \$6.63M to be spent in 2007

Please let me know if you need additional information.

Andrea

Andrea Schroeder
LG&E and KU
State Regulation and Rates
502-627-3651
502-627-3213 (fax)

From: Sturgeon, Allyson </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=N093308>
Sent: 5/5/2011 1:52:37 PM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; 'Riggs, Kendrick R.' <kendrick.riggs@skofirm.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Schram, Chuck <Chuck.Schram@lge-ku.com>; Wilson, Stuart <Stuart.Wilson@lge-ku.com>
Subject: Copy: ECR Testimony Review-Chuck Schram-Stuart Wilson
Location: LGEC12 North 1 (Cap 15)
Start: Mon 5/9/2011 3:00:00 PM
End: Mon 5/9/2011 4:30:00 PM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; 'Riggs, Kendrick R.'; Conroy, Robert; Schroeder, Andrea; Bellar, Lonnie; Schram, Chuck; Wilson, Stuart

From: Schroeder, Andrea
To: Sturgeon, Allyson
Sent: 5/5/2011 1:53:38 PM
Subject: Accepted: ECR Testimony Review-Chuck Schram-Stuart Wilson

From: Schroeder, Andrea
To: Sturgeon, Allyson
Sent: 5/9/2011 5:13:51 PM
Subject: Accepted: Final ECR Application and Testimony Review

From: Walters, Kim </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=E010358>
Sent: 5/11/2011 9:12:04 AM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; 'Riggs, Kendrick R.' <kendrick.riggs@skofirm.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Charnas, Shannon <Shannon.Charnas@lge-ku.com>; LGEC12 West 1201 (Cap 20) <LGEC12West1201Cap20@lge-ku.com>
Subject: Copy: ECR Testimony Review-Charnas
Location: LGEC 1201
Start: Wed 5/11/2011 10:00:00 AM
End: Wed 5/11/2011 11:00:00 AM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; 'Riggs, Kendrick R.'; Conroy, Robert; Schroeder, Andrea; Bellar, Lonnie; Charnas, Shannon; LGEC12 West 1201 (Cap 20)
Optional Attendees: 'Crosby, W. Duncan'

From: Schroeder, Andrea
To: Sturgeon, Allyson
Sent: 5/11/2011 9:17:15 AM
Subject: Accepted: ECR Testimony Review-Charnas

From: Walters, Kim </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=E010358>
Sent: 5/11/2011 2:34:21 PM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; 'Riggs, Kendrick R.' <kendrick.riggs@skofirm.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; LGEC12 West 1201 (Cap 20) <LGEC12West1201Cap20@lge-ku.com>
Subject: Copy: ECR Testimony Review-Bellar
Location: LGEC 1201/Conference Bridge
Start: Thu 5/12/2011 3:00:00 PM
End: Thu 5/12/2011 4:30:00 PM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; 'Riggs, Kendrick R.'; Conroy, Robert; Schroeder, Andrea; Bellar, Lonnie; LGEC12 West 1201 (Cap 20)
Optional Attendees: 'Crosby, W. Duncan'

Conferee code: 3825 Moderator Code: 3497
Conference Phone Numbers: 2526, LG&E Internal
7-627-2526, KU On-net 7+seven
627-2526, Louisville area local call
502-627-2526, North America Long Distance
866-877-4571, North America Toll Free
0 800 666 0569, Argentina FK Region
0 800-444-8188, Argentina AG Region

From: Schroeder, Andrea
To: Sturgeon, Allyson
Sent: 5/11/2011 2:44:56 PM
Subject: Accepted: ECR Testimony Review-Bellar

From: Schroeder, Andrea
To: Sebourn, Michael
Sent: 5/13/2011 5:18:40 PM
Subject: BR CCR Landfill Project IC Paper (21-Oct-10).docx
Attachments: BR CCR Landfill Project IC Paper (21-Oct-10).docx

Investment Proposal for Investment Committee Meeting on: October 25, 2010

Project Name: **E.W. Brown CCR Landfill Project**

Total Expenditures: **Total Project - \$154,939k & Landfill Phase I - \$57,121k**

Project Number: **119961, 125101, 127078**

Business Unit/Line of Business: **Project Engineering/Energy Services**

Prepared/Presented By: **John S. Williams/Scott Straight/Jeff Fraley**

Executive Summary

On June 21, 2010 the EPA issued a proposed Coal Combustion Residual (CCR) ruling that establishes federal guidelines for CCR storage. In light of the EPA's proposed CCR ruling, Project Engineering (PE) reviewed the CCR storage project (i.e., Main Ash Pond Project) at E.W. Brown (BR) that is under construction to evaluate effects the EPA's proposed CCR rules potentially impose on long-term wet storage of CCR at BR. The analysis is described in detail in the attached evaluation document and supplemental presentation.

Significant work has been completed on the BR CCR Ash Pond Project, including detailed engineering and permitting for all phases of the project, as well as the physical work of relocating the transmission lines that cross the ash pond, ash handling upgrades and construction of the Auxiliary (Aux) Pond to elevation 880'.

As of June 2010, the BR CCR Ash Pond Project Phase I spend is \$53.3M of the approved \$73.1M sanction. Construction of the final phase of the Aux Pond to elevation 900' is currently in progress and will proceed on an accelerated schedule to support CCR storage requirements. The Main Pond Starter Dike construction contract will undergo termination to avoid \$6.5M of stranded costs associated with installing materials presently stockpiled/procured that may be utilized in landfill construction. Both actions are precluded by the decision to convert the Main Ash Pond Project to a landfill as recommended by PE and the BR Station.

PE and the BR Station recommend the immediate implementation of Case A (2011 MTP/LTP) to convert the Main Pond into a Landfill, now before the Main Pond is placed into service, to meet the EPA's proposed CCR Ruling. This option has the lowest NPV & PVRR, is the least cost compared to converting later, maximizes the landfill footprint, maximizes future vertical expansion opportunities to accommodate changes in production, and eliminates the difficult and costly issues associated with maintaining station operations while dewatering and closing the pond post-EPA CCR Ruling while the landfill is being constructed. It should be noted that the proposed regulations will require long-term dry storage (landfill), this analysis reviewed the benefits of converting the Main Pond Project to a Landfill Project now rather than placing the pond in-service only to have to convert to landfill later.

Background

As a result of the EPA's proposed CCR Ruling, PE has reevaluated long-term CCR storage at BR as the current Main Pond design will no longer meet the 2030 storage requirement. The analyses are based on an assumption that the proposed ruling becomes effective on January 2012. The January 2012 effective date was based on the proposed ruling being approved in 2010, and accounted for one year of litigation before the ruling became effective. Moving forward, the CCR storage facility at BR will provide a minimum storage capacity of 7M yd³ and will allow for future expansion if necessary. The Base Case of continuing to construct the Main Pond and utilize it until 2030 will not be allowed under either scenario in the proposed regulations. In other words, the CCR landfill will be designed and permitted with the maximum footprint available and the height of the facility will be adjusted to meet potential changing capacity requirements. The recommended option is summarized below and descriptions of all options are incorporated into the attached evaluation document:

Case A (2011 MPT/LTP) – Stop construction of the Main Pond Starter Dike immediately and convert the Main Pond into a landfill prior to the effective date of the CCR Ruling and prior to placing wet CCR in the Main Pond. Complete construction of the Aux Pond 900' project utilizing rock in lieu of gypsum to accelerate construction completion prior to the rules becoming effective. The Aux Pond will eventually be closed per the new regulations once the landfill is placed into service.

Project Description

- **Project Scope and Timeline**

The overall scope of the Brown Landfill project is to provide 20-years of on-site storage for dry CCR's. Phase I of the Brown Landfill project includes the following activities: Main Pond ash grading, cap and closure, landfill engineering, permitting, regulatory filings, converting all station ash handling systems from wet to dry, installation of a second gypsum dewatering facility similar to what was constructed during Brown's FGD project, and constructing the initial phase of a landfill. Based on recent projects, the anticipated duration to perform these activities is 3.5 years with an in-service date of January 2014 as shown below:

Project Timeline		
Task	Date	Duration
Informal Meeting w/the PSC	November 2010	1 Day
Engineering	September 2010	3-4 Months
File Permits	December 2010	18 Months
ECR Filing	January 2011	6 Months
Construction	May 2012	18 Months

- **Project Cost**

Total cost to complete all phases of the Brown Landfill Project is \$154,939k with a Landfill Phase I cost of \$57,121k. Cost estimates are based on Level I engineering.

Economic Analysis and Risks

- **Assumptions**

The construction cost estimate is based on actual competitive bid unit rates, 6% escalation, 10% contingency, and 3.5% for E.ON U.S. overheads. The landfill has a 20-year design life and is based upon horizontal expansion.

- **Financial Summary**

PE with the assistance of MACTEC Engineering and Consulting, developed capital cost estimates for Case A and B. The ECR approved cost estimate is provided for reference only and Case A is the basis for the 2011MTP/LTP. The Base Case is a modification of the ECR approved option which provides 7M yd³ of storage and is no longer a viable long term solution for CCR storage as the current design of the Main Pond will not comply with the EPA's proposed CCR Ruling. *Implementing Case A (2011 MTP/LTP) or B is the only long term storage solution.*

Cost Estimate Comparison											
Option	Life	Capacity	2010	2011	2012	2013	2014	2015	NPV	PVRR	Total Project
ECR Approved	2054	15.5M yd ³	\$25,233	\$10,220	\$8,777	\$4,865	\$5,463	\$6,945	\$143,394	\$158,684	\$200,132
2010 MTP/LTP	2054	15.5M yd ³	\$28,360	\$10,220	\$8,777	\$4,865	\$5,463	\$6,945	\$147,372	\$162,662	\$203,781
Base Case	2030	7M yd ³	\$19,300	\$6,700	\$4,153	\$6,365	\$3,424	\$8,951	\$103,720	\$127,799	\$121,687
Case A (2011MTP/LTP)	2030	7M yd ³	\$9,051	\$14,262	\$26,722	\$24,064	\$0	\$0	\$126,322	\$181,791	\$154,939
Case B	2030	7M yd ³	\$19,350	\$2,907	\$3,605	\$10,786	\$31,135	\$31,387	\$143,980	\$204,633	\$193,567

NOTE 1: Case B values do not include the estimated \$2.0M for land purchase for additional clay borrow source.

NOTE 2: The NPV, PVRR, and Total Project values include investment to date and forecast through the project Life.

The breakdown of the \$154,939k is as follows (in \$000's):

Historic ash pond costs	\$ 55,306
Remaining ash (aux) pond costs	\$ 9,941
Landfill Phase 1	\$ 57,121
Landfill Phase 2	\$ 10,220
Landfill Phase 3	\$ 19,637
Closure Costs	\$ 2,714
Total	\$154,939

Financial Detail by Year (\$000s)	Pre 2010	2010	2011	2012	Post 2012	Total Project
1. Capital Investment Proposed - 2011 MTP	\$47,971	\$9,051	\$14,262	\$26,722	\$56,636	\$154,642
2. Capital Removal Proposed - 2011 MTP	\$297	\$0	\$0	\$0	\$0	\$297
3. Total Capital Costs Proposed (US GAAP) (sum of 1 & 2)	\$48,268	\$9,051	\$14,262	\$26,722	\$56,636	\$154,939
4. Capital Investment Cash Basis Proposed	\$46,508	\$10,350	\$13,329	\$26,561	\$57,894	\$154,642
5. Cap Interest Proposed (if applicable)						\$0
6. Total Capital Costs Proposed (IFRS) (sum of 4 & 5)	\$46,508	\$10,350	\$13,329	\$26,561	\$57,894	\$154,642
7. Capital Investment Cash Basis 2010 MTP	\$47,461	\$29,587	\$10,184	\$8,873	\$107,676	\$203,781
8. Cap Interest 2010 MTP (if applicable)	\$0	\$0	\$0	\$0	\$0	\$0
9. Total Capital Costs 2010 MTP (IFRS) (sum of 7 & 8)	\$47,461	\$29,587	\$10,184	\$8,873	\$107,676	\$203,781
10. Variance Capital Investment Cash Basis IFRS (9 less 6)	\$953	\$19,237	(\$3,145)	(\$17,688)	\$49,782	\$49,139
11. Project O&M Costs Proposed (US GAAP)	\$0	\$0	\$0	\$0	\$0	\$0
12. Capital Removal Proposed (Line 2 above)	\$297	\$0	\$0	\$0	\$0	\$297
13. Total Project Opex Costs Proposed (IFRS) (sum of 11 & 12)	\$297	\$0	\$0	\$0	\$0	\$297
14. Project O&M Costs 2010 MTP (US GAAP)	\$0	\$0	\$0	\$0	\$0	\$0
15. Capital Removal 2010 MTP	\$297	\$0	\$0	\$0	\$0	\$297
16. Total Project Opex Costs 2010 MTP (IFRS) (sum of 13 & 14)	\$297	\$0	\$0	\$0	\$0	\$297
17. Total Project Opex Variance to 2010 MTP (IFRS) (16 less 13)	\$0	\$0	\$0	\$0	\$0	\$0
18. EBIT	\$12,669	\$6,136	\$7,491	\$9,872	\$159,483	\$195,651
19. ROCE		11.62%	11.62%	11.62%		10.90%

Project Results	
Capital Expenditure (\$000):	\$154,939
NPV (\$000):	\$5,120
IRR:	7.1%
ROCE (20 yr.):	10.9%

The returns above are based on a continuation of the approved KU 2009 ECR Plan, Project Number KU-29. Should a new ECR filing be required, the timing of the cash flows will be different.

- **Sensitivities**

Sensitivities	Change in EBIT			Change in NPV Total
	2010	2011	2012	
Project Costs (Capital +/-10%)	+/- 614	+/- 749	+/-987	+/- 1183

- **Environmental**

Filing for landfill permits is scheduled for December 2010, following the engineering design.

New Source Review Evaluation, questions 1-6 (as applicable) must be completed on all investment proposals.		
1	Does the project include any new equipment or component with emissions, result in emissions not previously emitted or cause the unit to exceed any emission limit? If yes, Environmental Affairs is required to review this project. If no, go to Question #2.	NO
2	Question 2: Is the change a like-kind or functionally equivalent replacement under \$500K? If yes, the project is not subject to NSR and no further evaluation is required. If no, go to Question #3.	NO
3	Question 3: Does the equipment change increase the emissions unit's maximum hourly heat input? If yes, Environmental Affairs is required to review this project. If no, go to Question #4.	NO
4	Question 4: Does the equipment change increase the emissions unit's electrical output? If yes, Environmental Affairs is required to review this project. If no, go to Question #5.	NO
5	Question 5: Has the equipment being repaired/replaced been repaired or replaced in the past at this unit or other units in the fleet? If no, Environmental Affairs is required to review this project. If yes, list any known projects and go to Question #6.	NO
6	Question 6: Have there been forced outages or unit de-rates in the past 5 years due to this component? If no, the project is not subject to NSR and no further evaluation is required; if the answer is yes, Environmental Affairs needs to review this project.	NO

The Environmental Affairs Department was included in the development of the BR CCR Storage project and agrees with the chosen path forward.

- **Risks**
- *Schedule* – Several items will impact the schedule including engineering/design, permitting, a new or updated ECR/CPCN filing, and initial landfill construction. Based on experience from previous projects the engineering/design will take approximately 3-4-months and will include development of the landfill drawings, specifications, stability analysis, groundwater monitoring plan, and permit application.
- *Weather* – Earthen material placement is highly weather dependent.
- *Oil Prices* – The cost of oil is another risk as oil has a direct affect on material placement unit rates as well as petroleum based products such as flexible membrane liners and filter fabrics.
- **Other Alternatives Considered**
The analyses were based on an assumption that the proposed EPA ruling becomes approved in 2010 and effective in January 2012. The options are summarized below and a more detailed analysis can be found in the attached evaluation document:
 - **Base Case** – Continue with construction of the Aux Pond to elevation 900' and the Main Pond to 962' per the original design.

- **Case A (2011 MTP/LTP) (Recommended)** – Stop construction of the Main Pond Starter Dike immediately and convert the Main Pond into a landfill prior to the effective date of the CCR Ruling and prior to placing wet CCR in the Main Pond. Complete construction of the Aux Pond 900' project utilizing rock in lieu of gypsum to accelerate construction completion prior to the rules becoming effective. The Aux Pond will eventually be closed per the new regulations once the landfill is placed into service.
- **Case B** – Continue construction of the Main Pond Starter Dike and Aux Pond 900' per the original design. Once the CCR Ruling becomes effective, take the Main Pond out of service, close and cap it per the new regulations, and then construct a landfill similar to Case A (2011 MTP/LTP) on top of the newly constructed Main Pond Starter Dike. As with Case A (2011 MTP/LTP), once the landfill is placed into service the Aux Pond will be closed per the regulations.
- **Case C** – Modify the design of the Main Pond and install a composite liner per Subtitle “D” requirements. Complete the Aux Pond 900' project as originally designed.

Conclusions and Recommendation

Project Engineering and the BR Station recommend the implementation of Case A (2011 MTP/LTP) to convert the Main Pond into a Landfill to meet the EPA’s proposed CCP Ruling in the amount of \$154,939k inclusive of a sanction Landfill Phase I cost of \$57,121k. This option has the lowest NPV and NPVRR of the Cases reviewed while maximizing the landfill footprint. Maximizing the landfill footprint also maximizes future vertical expansion opportunities and eliminates future cost and issues associated with Station operations while dewatering and closing the pond post-EPA CCR Ruling. It is important to note that both options proposed by the EPA for CCR storage are for long-term dry storage (i.e., landfill). Therefore, continuing the Main Pond Project as it is currently designed will not eliminate the requirement to convert all CCR storage to a dry landfill should either of the EPA proposed regulations become final.

	A	B	C	D	E	F	G
1	Financial Detail by Year (\$000s)	Pre	2010	2011	2012	Post	Total
2		2010				2012	Project
3	1. Capital Investment Proposed - 2011 MTP	\$47,971	\$9,051	\$14,262	\$26,722	\$56,636	\$154,642
4	2. Capital Removal Proposed - 2011 MTP	\$297	\$0	\$0	\$0	\$0	\$297
5	3. Total Capital Costs Proposed (US GAAP) (sum of 1 & 2)	\$48,268	\$9,051	\$14,262	\$26,722	\$56,636	\$154,939
6	4. Capital Investment Cash Basis Proposed	\$46,508	\$10,350	\$13,329	\$26,561	\$57,894	\$154,642
7	5. Cap Interest Proposed (if applicable)						\$0
8	6. Total Capital Costs Proposed (IFRS) (sum of 4 & 5)	\$46,508	\$10,350	\$13,329	\$26,561	\$57,894	\$154,642
9	7. Capital Investment Cash Basis 2010 MTP	\$47,461	\$29,587	\$10,184	\$8,873	\$107,676	\$203,781
10	8. Cap Interest 2010 MTP (if applicable)	\$0	\$0	\$0	\$0	\$0	\$0
11	9. Total Capital Costs 2010 MTP (IFRS) (sum of 7 & 8)	\$47,461	\$29,587	\$10,184	\$8,873	\$107,676	\$203,781
12	10. Variance Capital Investment Cash Basis IFRS (2011 MTP - 2010 MTP)	\$953	\$19,237	(\$3,145)	(\$17,688)	\$49,782	\$49,139
13	11. Project O&M Costs Proposed (US GAAP)	\$0	\$0	\$0	\$0	\$0	\$0
14	12. Capital Removal Proposed (Line 2 above)	\$297	\$0	\$0	\$0	\$0	\$297
15	13. Total Project Opex Costs Proposed (IFRS) (sum of 11 & 12)	\$297	\$0	\$0	\$0	\$0	\$297
16	14. Project O&M Costs 2010 MTP (US GAAP)	\$0	\$0	\$0	\$0	\$0	\$0
17	15. Capital Removal 2010 MTP	\$297	\$0	\$0	\$0	\$0	\$297
18	16. Total Project Opex Costs 2010 MTP (IFRS) (sum of 14 & 15)	\$297	\$0	\$0	\$0	\$0	\$297
19	17. Total Project Opex Variance to 2010 MTP (IFRS) (16 - 15)	\$0	\$0	\$0	\$0	\$0	\$0
20							
21	18. EBIT	\$12,669	\$6,136	\$7,491	\$9,872	\$159,483	\$195,651
22	19. ROCE		11.62%	11.62%	11.62%		10.90%

From: Walters, Kim </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=E010358>
Sent: 5/18/2011 7:58:08 AM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; Voyles, John <John.Voyles@lge-ku.com>; Schram, Chuck <Chuck.Schram@lge-ku.com>; Charnas, Shannon <Shannon.Charnas@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Revlett, Gary <Gary.Revlett@lge-ku.com>; Straight, Scott <Scott.Straight@lge-ku.com>; Wilson, Stuart <Stuart.Wilson@lge-ku.com>; Saunders, Eileen <Eileen.Saunders@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; 'Riggs, Kendrick R.' <kendrick.riggs@skofirm.com>; 'Crosby, W. Duncan' <duncan.crosby@skofirm.com>; LGEC12 West 1202 (Cap 35) <EONUSC12WEST1202@lge-ku.com>
Subject: Copy: Final ECR Application and Testimony Review (Updated with new location)
Location: LGEC 1202
Start: Wed 5/18/2011 1:00:00 PM
End: Wed 5/18/2011 3:00:00 PM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; Voyles, John; Schram, Chuck; Charnas, Shannon; Bellar, Lonnie; Conroy, Robert; Revlett, Gary; Straight, Scott; Wilson, Stuart; Saunders, Eileen; Schroeder, Andrea; 'Riggs, Kendrick R.'; 'Crosby, W. Duncan'; LGEC12 West 1202 (Cap 35)

From: Schroeder, Andrea
To: Voyles, John
Sent: 5/24/2011 8:52:01 AM
Subject: RE: ECR

Robert & I will review the filings in total on Thursday. Final versions will be sent to each witness for final review as soon as I get this round of comments back from the witnesses.

-----Original Message-----

From: Voyles, John
Sent: Tuesday, May 24, 2011 6:26 AM
To: Schroeder, Andrea
Subject: ECR

Andrea,

Is anyone (Duncan perhaps) doing a last read of the testimonies?

JV

From: Schroeder, Andrea
To: Conroy, Robert
Sent: 5/24/2011 6:54:23 PM
Subject: ECR tariff

Let me know what you get worked out on the ECR tariffs so I can work with Mary to prepare the version with revision marks in the margin to attach to the Applications.

Andrea Schroeder
LG&E and KU
State Regulation and Rates
502-627-3651
502-627-3213 (fax)

From: Schroeder, Andrea
To: Conroy, Robert
Sent: 5/25/2011 11:16:14 AM
Subject: RE: Testimony.

Preparing final version to send out to witnesses now. Due to Paul's offsite managers meeting, I won't get John's final version of testimony and Strategy Summary until tomorrow morning.

Just talked to Xerox - they have crews working this weekend to get bill inserts ready so printing the ECR filing by Tuesday (5/31) will not be a problem. Plan is to have PDF versions ready on Friday for Xerox to expedite the process. If proof is not available on Friday, I'll meet Maggie at BOC on Saturday. Xerox has staff available to put copies in books as they come off the printer.

KU Business Office copies have been factored into number of KU Application copies needed. I'll confirm that we have an updated list of the offices & addresses.

Supplies were verified weeks ago - exact copies for each Company have been counted out and are ready to go.

-----Original Message-----

From: Conroy, Robert
Sent: Wednesday, May 25, 2011 7:24 AM
To: Schroeder, Andrea
Subject: Testimony.

Go ahead and send out the testimony to the witnesses after getting all edits included in the Final version. Looked like Duncan still had some questions to address.

Make sure that Xerox is on notice to get copies done and that we have all supplies. Remember for KU we have to display in all business offices.

Thanks
Robert

Sent from my iPhone

From: Voyles, John
To: Rives, Brad; Blake, Kent; Arbough, Dan; Thompson, Paul
Sent: 1/5/2011 4:01:21 PM
Subject: Fw: Air Totals With No SCRs and with Only Ghent 2 SCR
Attachments: Environmental Summary Breakdown 1-3-11 R1.xlsx

From our discussion today.

JV

From: Straight, Scott
Sent: Wednesday, January 05, 2011 09:30 AM
To: Saunders, Eileen; Hudson, Rusty; Ritchey, Stacy; Garrett, Chris
Cc: Joyce, Jeff; Kirkland, Mike; Bowling, Ralph; Voyles, John
Subject: FW: Air Totals With No SCRs and with Only Ghent 2 SCR

All,

A small note to clarify the parenthetical in Rusty's note. The \$7M for each SCR unit that Rusty referenced is for a modification to allow SCR operation at reduced loads beyond what these units can do now. The hot water recirc process is just one method to achieve this capability. I would title the \$7M for each unit something like "SCR Turndown" instead of hot water recirc to pick up the other ways to achieve the results we want.

"cc" Joyce and Kirkland to keep them in the info loop.

Scott

From: Hudson, Rusty
Sent: Monday, January 03, 2011 5:20 PM
To: Garrett, Chris
Cc: Ritchey, Stacy; Straight, Scott
Subject: Air Totals With No SCRs and with Only Ghent 2 SCR

Chris, at Paul's 4:00 meeting it was determined that we should provide a range between none of the SCR's being built, and just the Ghent 2 SCR being built. Given that new EPA allocations will be issued in March of 2011 and that we are right on the margin until the Cane Run combined cycle unit comes on line, that should give us room in case the allocations go against us. Also included in the numbers is \$7m per unit for turn-down capabilities on the existing units of Ghent 1,3, and 4, and MC 3 and 4 (adding hot water recirc similar to what is being done on Brown 3). The range therefore is a reduction of \$379m if Ghent 2 is still built, to \$641m if none of the SCR's are built. Rusty

<<Environmental Summary Breakdown 1-3-11 R1.xlsx>>

	A	D	E	F	G	H	I	J	K	L	M	N
1	2.) Environmental Air - CATR by January 2015, NAAQS by January 2016, HAPs by January 2017											
2	Capital Cost - Investment Accrual Basis (Includes Removal/ARO), Excluding all SCR except Ghent 2											
3	\$ in thousands											
4		Total	2010	2011	2012	2013	2014	2015	2016	2017		
5	Cash Flow By Year											
6	Brown											
7	Brown 1 - Baghouse	\$39,218		\$1,830	\$13,322	\$15,834	\$8,233					
8	Brown 1 - PAC Injection	\$1,899		\$0	\$0	\$931	\$968					
9	Brown 1 - SAM Mitigation	\$4,632		\$215	\$1,343	\$1,863	\$1,211					
10	Total Brown 1	\$45,750	\$0	\$2,045	\$14,665	\$18,627	\$10,412	\$0	\$0	\$0		
11												
12	Brown 2 - Baghouse	\$41,179		\$0	\$1,522	\$11,875	\$13,174	\$13,272	\$1,336	\$0		
13	Brown 2 - PAC Injection	\$3,058		\$0	\$0	\$0	\$1,499	\$1,559	\$0	\$0		
14	Brown 2 - SAM Mitigation	\$4,568		\$215	\$1,791	\$2,561	\$0	\$0	\$0	\$0		
15	Total Brown 2	\$48,805	\$0	\$215	\$3,314	\$14,437	\$14,673	\$14,831	\$1,336	\$0		
16												
17	Brown 1 & 2 - SAM Mitigation											
18												
19	Brown 3 - Baghouse	\$76,066		\$0	\$0	\$2,131	\$25,851	\$36,102	\$11,983	\$0		
20	Brown 3 - PAC Injection	\$6,835		\$0	\$0	\$0	\$1,211	\$4,314	\$1,310	\$0		
21	Total Brown 3	\$82,901	\$0	\$0	\$0	\$2,131	\$27,061	\$40,416	\$13,292	\$0		
22												
23	Total Brown	\$177,455	\$0	\$2,260	\$17,978	\$35,194	\$52,146	\$55,248	\$14,628	\$0		
24												
25	Ghent											
26	Ghent 1 - Baghouse	\$163,356				\$4,575	\$55,515	\$77,531	\$25,734			
27	Ghent 1 - PAC Injection	\$8,036		\$0	\$0	\$0	\$1,211	\$5,515	\$1,310	\$0		
28	Ghent 1 - SAM Mitigation	\$7,750	\$375	\$7,375								
29	Total Ghent 1	\$179,142	\$375	\$7,375	\$0	\$4,575	\$56,726	\$83,047	\$27,043	\$0		
30												
31	Ghent 2 - SCR	\$262,878		\$12,217	\$76,235	\$105,712	\$68,713	\$0	\$0	\$0		
32	Ghent 2 - Baghouse	\$149,464		\$0	\$0	\$5,588	\$50,854	\$71,021	\$22,001			
33	Ghent 2 - PAC Injection	\$7,695		\$0	\$0	\$0	\$1,211	\$5,174	\$1,310			
34	Ghent 2 - SAM Mitigation	\$7,750	\$375	\$7,375								
35	Total Ghent 2	\$427,787	\$375	\$19,592	\$76,235	\$111,301	\$120,778	\$76,195	\$23,311	\$0		
36												
37	Ghent 3 - Baghouse	\$170,210		\$0	\$0	\$19,280	\$58,482	\$83,412	\$9,036	\$0		
38	Ghent 3 - PAC Injection	\$7,624		\$0	\$0	\$0	\$3,737	\$3,887	\$0	\$0		
39	Ghent 3 - SAM Mitigation	\$8,570	\$250	\$650	\$7,670							
40	Total Ghent 3	\$186,403	\$250	\$650	\$7,670	\$19,280	\$62,219	\$87,298	\$9,036	\$0		
41												
42	Ghent 4 - Baghouse	\$144,530		\$0	\$0	\$13,622	\$49,582	\$73,665	\$7,661	\$0		
43	Ghent 4 - PAC Injection	\$7,669		\$0	\$0	\$0	\$3,760	\$3,910	\$0	\$0		
44	Ghent 4 - SAM Mitigation	\$8,570	\$250	\$650	\$7,670							
45	Total Ghent 4	\$160,770	\$250	\$650	\$7,670	\$13,622	\$53,342	\$77,575	\$7,661	\$0		
46												
47	Total Ghent	\$954,101	\$1,250	\$28,267	\$91,575	\$148,777	\$293,065	\$324,115	\$67,052	\$0		
48												
49	Mill Creek											
50	Mill Creek 1 - FGD Upgrade	\$49,565		\$0	\$0	\$12,006	\$34,962	\$2,597	\$0	\$0		

Draft

	A	D	E	F	G	H	I	J	K	L	M	N
51	Mill Creek 1 - Baghouse	\$96,033		\$0	\$9,051	\$32,945	\$48,947	\$5,090	\$0	\$0		
52	Mill Creek 1 - PAC Injection	\$5,085		\$0	\$480	\$1,748	\$2,857	\$0	\$0	\$0		
53	Mill Creek 1 - SAM Mitigation	\$10,137		\$0	\$0	\$461	\$959	\$2,992	\$5,186	\$539		
54	Total Mill Creek 1	\$160,821	\$0	\$0	\$9,531	\$47,160	\$87,725	\$10,680	\$5,186	\$539		
55												
56	Mill Creek 2 - FGD Upgrade	\$47,659		\$0	\$11,544	\$33,617	\$2,497	\$0	\$0	\$0		
57	Mill Creek 2 - Baghouse	\$92,339		\$8,703	\$31,678	\$47,064	\$4,895	\$0	\$0	\$0		
58	Mill Creek 2 - Electrostatic Precipitator	\$37,690		\$3,552	\$12,930	\$19,210	\$1,998	\$0	\$0	\$0		
59	Mill Creek 2 - PAC Injection	\$4,890		\$462	\$1,681	\$2,747	\$0	\$0	\$0	\$0		
60	Mill Creek 2 - SAM Mitigation	\$9,747		\$0	\$443	\$922	\$2,877	\$4,987	\$519	\$0		
61	Total Mill Creek 2	\$192,325	\$0	\$12,717	\$58,276	\$103,560	\$12,267	\$4,987	\$519	\$0		
62												
63	Mill Creek 3 - FGD (U4 update and tie in)	\$84,262		\$0	\$0	\$0	\$59,235	\$25,027	\$0	\$0		
64	Mill Creek 3 - FGD (Unit 3 Removal)	\$25,500		\$0	\$0	\$0	\$6,375	\$19,125	\$0	\$0		
65	Mill Creek 3 - Baghouse	\$125,943		\$0	\$2,331	\$36,368	\$47,908	\$39,335	\$0	\$0		
66	Mill Creek 3 - PAC Injection	\$6,683		\$0	\$124	\$1,930	\$2,542	\$2,087	\$0	\$0		
67	Total Mill Creek 3	\$242,388	\$0	\$0	\$2,455	\$38,297	\$116,061	\$85,575	\$0	\$0		
68												
69	Mill Creek 4 - FGD	\$271,994		\$20,344	\$89,920	\$104,519	\$57,210	\$0	\$0	\$0		
70	Mill Creek 4 - SCR Upgrade	\$5,696		\$4,521	\$1,175	\$0	\$0	\$0	\$0	\$0		
71	Mill Creek 4 - Baghouse	\$151,571		\$5,651	\$51,425	\$61,122	\$33,373	\$0	\$0	\$0		
72	Mill Creek 4 - PAC Injection	\$7,882		\$294	\$2,674	\$3,178	\$1,735	\$0	\$0	\$0		
73	Mill Creek 4 - Ammonia	\$11,528		\$5,651	\$5,877	\$0	\$0	\$0	\$0	\$0		
74	Total Mill Creek 4	\$448,671	\$0	\$36,461	\$151,072	\$168,820	\$92,319	\$0	\$0	\$0		
75												
76	Total Mill Creek	\$1,044,205	\$0	\$49,177	\$221,334	\$357,838	\$308,371	\$101,241	\$5,705	\$539		
77												
78	Trimble											
79	Trimble 1 - Baghouse	\$158,119	\$0	\$0	\$0	\$14,902	\$54,244	\$80,591	\$8,381	\$0		
80	Trimble 1 - PAC Injection	\$7,967	\$0	\$0	\$0	\$0	\$3,905	\$4,062	\$0	\$0		
81	Total Trimble 1	\$166,086	\$0	\$0	\$0	\$14,902	\$58,149	\$84,653	\$8,381	\$0		
82												
83	Total Trimble	\$166,086	\$0	\$0	\$0	\$14,902	\$58,149	\$84,653	\$8,381	\$0		
84												
85	Environmental Air Studies											
86	Environmental Air Studies	\$2,000	\$1,250	\$750	\$0	\$0	\$0	\$0	\$0	\$0		
87	Total Environmental Air Studies	\$2,000	\$1,250	\$750	\$0	\$0	\$0	\$0	\$0	\$0		
88												
89												
90	Total Environmental Compliance - Air	\$2,343,848	\$2,500	\$80,455	\$330,887	\$556,712	\$711,731	\$565,256	\$95,766	\$539		
91												
92	Variance to MTP (Only SCR Ghent 2)	(\$378,754)	\$0	(\$13,078)	(\$44,194)	(\$95,869)	(\$91,563)	(\$81,855)	(\$49,553)	(\$2,643)		
93	LGE Variance to MTP (Only SCR Ghent 2)	(\$226,458)	\$0	\$0	\$3,742	(\$28,016)	(\$68,134)	(\$81,855)	(\$49,553)	(\$2,643)		
94	KU Variance to MTP (Only SCR Ghent 2)	(\$152,296)	\$0	(\$13,078)	(\$47,936)	(\$67,853)	(\$23,429)	\$0	\$0	\$0		
95												
96	\$7m for each of five SCR's (three KU and two LG&E) has been added back in (above) for turn-down capabilities (1/2 in 2012 and 1/2 in 2013).											
97	LG&E (two Mill Creek units)				7000	7000						
98	KU (three Ghent units)				10500	10500						

	A	D	E	F	G	H	I	J	K	L	M	N
1	2.) Environmental Air - CATR by January 2015, NAAQS by January 2016, HAPs by January 2017											
2	Capital Cost - Investment Accrual Basis (Includes Removal/ARO), No SCR											
3	\$ in thousands											
4		Total	2010	2011	2012	2013	2014	2015	2016	2017		
5	Cash Flow By Year											
6	Brown											
7	Brown 1 - Baghouse	\$39,218		\$1,830	\$13,322	\$15,834	\$8,233					
8	Brown 1 - PAC Injection	\$1,899		\$0	\$0	\$931	\$968					
9	Brown 1 - SAM Mitigation	\$4,632		\$215	\$1,343	\$1,863	\$1,211					
10	Total Brown 1	\$45,750	\$0	\$2,045	\$14,665	\$18,627	\$10,412	\$0	\$0	\$0		
11												
12	Brown 2 - Baghouse	\$41,179		\$0	\$1,522	\$11,875	\$13,174	\$13,272	\$1,336	\$0		
13	Brown 2 - PAC Injection	\$3,058		\$0	\$0	\$0	\$1,499	\$1,559	\$0	\$0		
14	Brown 2 - SAM Mitigation	\$4,568		\$215	\$1,791	\$2,561	\$0	\$0	\$0	\$0		
15	Total Brown 2	\$48,805	\$0	\$215	\$3,314	\$14,437	\$14,673	\$14,831	\$1,336	\$0		
16												
17	Brown 1 & 2 - SAM Mitigation											
18												
19	Brown 3 - Baghouse	\$76,066		\$0	\$0	\$2,131	\$25,851	\$36,102	\$11,983	\$0		
20	Brown 3 - PAC Injection	\$6,835		\$0	\$0	\$0	\$1,211	\$4,314	\$1,310	\$0		
21	Total Brown 3	\$82,901	\$0	\$0	\$0	\$2,131	\$27,061	\$40,416	\$13,292	\$0		
22												
23	Total Brown	\$177,455	\$0	\$2,260	\$17,978	\$35,194	\$52,146	\$55,248	\$14,628	\$0		
24												
25	Ghent											
26	Ghent 1 - Baghouse	\$163,356		\$0	\$0	\$4,575	\$55,515	\$77,531	\$25,734	\$0		
27	Ghent 1 - PAC Injection	\$8,036		\$0	\$0	\$0	\$1,211	\$5,515	\$1,310	\$0		
28	Ghent 1 - SAM Mitigation	\$7,750	\$375	\$7,375	\$0	\$0	\$0	\$0	\$0	\$0		
29	Total Ghent 1	\$179,142	\$375	\$7,375	\$0	\$4,575	\$56,726	\$83,047	\$27,043	\$0		
30												
31	Ghent 2 - Baghouse	\$149,464		\$0	\$0	\$5,588	\$50,854	\$71,021	\$22,001	\$0		
32	Ghent 2 - PAC Injection	\$7,695		\$0	\$0	\$0	\$1,211	\$5,174	\$1,310	\$0		
33	Ghent 2 - SAM Mitigation	\$7,750	\$375	\$7,375	\$0	\$0	\$0	\$0	\$0	\$0		
34	Total Ghent 2	\$164,909	\$375	\$7,375	\$0	\$5,588	\$52,065	\$76,195	\$23,311	\$0		
35												
36	Ghent 3 - Baghouse	\$170,210		\$0	\$0	\$19,280	\$58,482	\$83,412	\$9,036	\$0		
37	Ghent 3 - PAC Injection	\$7,624		\$0	\$0	\$0	\$3,737	\$3,887	\$0	\$0		
38	Ghent 3 - SAM Mitigation	\$8,570	\$250	\$650	\$7,670	\$0	\$0	\$0	\$0	\$0		
39	Total Ghent 3	\$186,403	\$250	\$650	\$7,670	\$19,280	\$62,219	\$87,298	\$9,036	\$0		
40												
41	Ghent 4 - Baghouse	\$144,530		\$0	\$0	\$13,622	\$49,582	\$73,665	\$7,661	\$0		
42	Ghent 4 - PAC Injection	\$7,669		\$0	\$0	\$0	\$3,760	\$3,910	\$0	\$0		
43	Ghent 4 - SAM Mitigation	\$8,570	\$250	\$650	\$7,670	\$0	\$0	\$0	\$0	\$0		
44	Total Ghent 4	\$160,770	\$250	\$650	\$7,670	\$13,622	\$53,342	\$77,575	\$7,661	\$0		
45												
46	Total Ghent	\$691,224	\$1,250	\$16,050	\$15,340	\$43,065	\$224,352	\$324,115	\$67,052	\$0		
47												
48	Mill Creek											
49	Mill Creek 1 - FGD Upgrade	\$49,565		\$0	\$0	\$12,006	\$34,962	\$2,597	\$0	\$0		
50	Mill Creek 1 - Baghouse	\$96,033		\$0	\$9,051	\$32,945	\$48,947	\$5,090	\$0	\$0		

Draft

	A	D	E	F	G	H	I	J	K	L	M	N
51	Mill Creek 1 - PAC Injection	\$5,085		\$0	\$480	\$1,748	\$2,857	\$0	\$0	\$0		
52	Mill Creek 1 - SAM Mitigation	\$10,137		\$0	\$0	\$461	\$959	\$2,992	\$5,186	\$539		
53	Total Mill Creek 1	\$160,821	\$0	\$0	\$9,531	\$47,160	\$87,725	\$10,680	\$5,186	\$539		
54												
55	Mill Creek 2 - FGD Upgrade	\$47,659		\$0	\$11,544	\$33,617	\$2,497	\$0	\$0	\$0		
56	Mill Creek 2 - Baghouse	\$92,339		\$8,703	\$31,678	\$47,064	\$4,895	\$0	\$0	\$0		
57	Mill Creek 2 - Electrostatic Precipitator	\$37,690		\$3,552	\$12,930	\$19,210	\$1,998	\$0	\$0	\$0		
58	Mill Creek 2 - PAC Injection	\$4,890		\$462	\$1,681	\$2,747	\$0	\$0	\$0	\$0		
59	Mill Creek 2 - SAM Mitigation	\$9,747		\$0	\$443	\$922	\$2,877	\$4,987	\$519	\$0		
60	Total Mill Creek 2	\$192,325	\$0	\$12,717	\$58,276	\$103,560	\$12,267	\$4,987	\$519	\$0		
61												
62	Mill Creek 3 - FGD (U4 update and tie in)	\$84,262		\$0	\$0	\$0	\$59,235	\$25,027	\$0	\$0		
63	Mill Creek 3 - FGD (Unit 3 Removal)	\$25,500		\$0	\$0	\$0	\$6,375	\$19,125	\$0	\$0		
64	Mill Creek 3 - Baghouse	\$125,943		\$0	\$2,331	\$36,368	\$47,908	\$39,335	\$0	\$0		
65	Mill Creek 3 - PAC Injection	\$6,683		\$0	\$124	\$1,930	\$2,542	\$2,087	\$0	\$0		
66	Total Mill Creek 3	\$242,388	\$0	\$0	\$2,455	\$38,297	\$116,061	\$85,575	\$0	\$0		
67												
68	Mill Creek 4 - FGD	\$271,994		\$20,344	\$89,920	\$104,519	\$57,210	\$0	\$0	\$0		
69	Mill Creek 4 - SCR Upgrade	\$5,696		\$4,521	\$1,175	\$0	\$0	\$0	\$0	\$0		
70	Mill Creek 4 - Baghouse	\$151,571		\$5,651	\$51,425	\$61,122	\$33,373	\$0	\$0			
71	Mill Creek 4 - PAC Injection	\$7,882		\$294	\$2,674	\$3,178	\$1,735	\$0	\$0			
72	Mill Creek 4 - Ammonia	\$11,528		\$5,651	\$5,877	\$0	\$0	\$0	\$0			
73	Total Mill Creek 4	\$448,671	\$0	\$36,461	\$151,072	\$168,820	\$92,319	\$0	\$0	\$0		
74												
75	Total Mill Creek	\$1,044,205	\$0	\$49,177	\$221,334	\$357,838	\$308,371	\$101,241	\$5,705	\$539		
76												
77	Trimble											
78	Trimble 1 - Baghouse	\$158,119	\$0	\$0	\$0	\$14,902	\$54,244	\$80,591	\$8,381	\$0		
79	Trimble 1 - PAC Injection	\$7,967	\$0	\$0	\$0	\$0	\$3,905	\$4,062	\$0	\$0		
80	Total Trimble 1	\$166,086	\$0	\$0	\$0	\$14,902	\$58,149	\$84,653	\$8,381	\$0		
81												
82	Total Trimble	\$166,086	\$0	\$0	\$0	\$14,902	\$58,149	\$84,653	\$8,381	\$0		
83												
84	Environmental Air Studies											
85	Environmental Air Studies	\$2,000	\$1,250	\$750	\$0	\$0	\$0	\$0	\$0	\$0		
86	Total Environmental Air Studies	\$2,000	\$1,250	\$750	\$0	\$0	\$0	\$0	\$0	\$0		
87												
88												
89	Total Environmental Compliance - Air	\$2,080,970	\$2,500	\$68,238	\$254,653	\$450,999	\$643,018	\$565,256	\$95,766	\$539		
90												
91	Variance to MTP (No SCR Amounts)	(\$641,631)	\$0	(\$25,295)	(\$120,429)	(\$201,581)	(\$160,276)	(\$81,855)	(\$49,553)	(\$2,643)		
92	LGE Variance to MTP (No SCR Amounts)	(\$226,458)	\$0	\$0	\$3,742	(\$28,016)	(\$68,134)	(\$81,855)	(\$49,553)	(\$2,643)		
93	KU Variance to MTP (No SCR Amounts)	(\$415,174)	\$0	(\$25,295)	(\$124,171)	(\$173,565)	(\$92,142)	\$0	\$0	\$0		
94												
95	\$7m for each of five SCR's (three KU and two LG&E) has been added back in (above) for turn-down capabilities (1/2 in 2012 and 1/2 in 2013).											
96	LG&E (two Mill Creek units)				7000	7000						
97	KU (three Ghent units)				10500	10500						

From: Voyles, John
To: Thompson, Paul; Sinclair, David; Bowling, Ralph; Staton, Ed; Hudson, Rusty; Hincker, Loren
CC: Schram, Chuck; Yussman, Eric
Sent: 1/10/2011 10:04:29 AM
Subject: EPA Regs Timeline
Attachments: EPA Regs Schedule 20110110.docx

For the staff meeting action item, please see the latest draft with expanded dates and milestones of decisions for discussion.

2012 already has some high level timing that can be added going forward as we progress during the first quarter this year, but have not been added here at this point.

JV

January 10, 2011

Key 2011 Dates for EPA Regulations Actions

Date	Item	Input/Review
Jan 14, 2011	Complete review of EPA's two alternate CATR allowance allocation methods	Env, Gen Planning
Jan 28, 2011	RFP responses for CR replacement capacity due	ES
Jan 31, 2011	Finalize content and timing of ECR filing	ES, RR
Mar 11, 2011	Review ECR filing draft	ES, RR
Mar 18, 2011	Evaluation of RFP responses complete	Gen Plan
Mar 31, 2011	Receive updated CATR NO _x /SO ₂ allocation information; MACT/HAPS proposed rule issued	Env, Proj Eng, Gen Plan
Apr 1, 2011	Potential ECR filing for MC FGDs, BR landfill, GH SAM Mitigation; (bag houses and GH2 SCR TBD)	Prj Eng, Gen Plan, RR
Apr 18, 2011	Finalize CATR control plan based on revised NO _x / SO ₂ allocations	Prj Eng, Gen Plan
Apr 29, 2011	Finalize scope of meeting MACT/HAPS proposed rule	Prj Eng, Gen Plan
May 31, 2011	Inv Committee/internal approvals before public mtgs	ES
Jun 1, 2011	Public ROW meetings – gas pipeline (conclude by Jul 18)	ES, RR
Jul 26, 2011	EPA releases proposed GHG regs	Env, ES
Sep 1, 2011	File CCN for CR replacement	ES, RR
Oct-Dec, 2011	Prepare Transmission CCN for CR replacement	Trans, RR
Nov 19, 2011	Potential ECR filing for MACT/HAPS controls, SCRs (if any result from revised CATR allowance allocation)	Prj Eng, Gen Plan, RR
Nov 30, 2011	Receive final MACT/HAPS rule	Env, ES
Dec 30, 2011	Review MACT/HAPS control plan based on final rule	Prj Eng

Input/Review: Env = Environmental; ES= Energy Services; RR = Rates and Regulatory

From: Jackson, Fred
To: Thompson, Paul
CC: Voyles, John
Sent: 2/24/2011 2:49:53 PM
Subject: Draft Energy Services Major Projects Report November 2010 -January 2011
Attachments: Energy Services Major Projects Monthly Report November 2010 - January 2011 Draft.docx; PE's Bi-Weekly Update of 1-14-11.docx; PE's Bi-Weekly Update of 1-28-11.docx

Paul,

Attached is a draft of the November 2010 - January 2011 ES Major Projects Monthly Report. All updates are shown as tracked changes against the October report you sent to Vic. I have ***not*** mentioned the potential Cane Run CCGT impact on Cane Run CCP project other than a that a smaller landfill design is being developed as an alternative based on pending environmental regulations..

I also attached the January 14 and January 28 Project Engineering Bi-Weekly Update as reference. Please let me know if questions.

Thanks,
Fred

Energy Services Major Projects Monthly Report November 2010 – January 2011

I. KU SOx Program

A. Safety

Fluor received the Governor's Safety Award for 4.5 million safe work hours without a lost time injury.

B. Schedule

Ghent: Unit 4 ID fans installed and in service.

Brown: FGD tie-in to Units 1, 2, and 3 successfully completed. Performance Testing scheduled for March/April.

Note: Fluor is demobilized from both Ghent and Brown.

C. Budget

Brown: Currently forecasting a positive variance to budget of greater than \$80M.

D. Issues/Risks

Siding on Ghent Unit 1 SCR and FGD complete.

II. Trimble County 2

A. Safety

No Issues to report.

B. Schedule

Amendment 2 to Bechtel EPC contract finalized on January 22 allowing commercial care, custody, and control of the unit to transfer to Owners on January 22 while suspending LD's to Bechtel while Bechtel completes burner and ammonia forwarding system work. This Amendment reserves Company rights to LD's, warranty, performance, risk of loss, among other key business points during the Interim Operating Period. Guaranteed Performance Testing completed with the unit passing heat rate, net generation, and all environmental air emission permit conditions.

C. Budget

Forecasted to slightly overrun sanction pending final closeout of EPC. Liquidated damages paid to date by Bechtel total \$25.65M.

D. Issues/Risks

Settlement discussions on remaining LDs in progress.

Design of the DBEL burners/combustion system for our coal specification

III. Brown Ash Pond/Landfill

A. Safety

No issues to Report

B. Schedule

Work on Phase I of the Main Pond was suspended. Detail engineering to convert the Main Pond to a landfill proceeding to plan for a 2011 ECR filing. Phase II of II on Aux Pond proceeding to plan.

C. Budget

No Material Change

D. Issues/Risks

Potential impact of proposed coal combustion products regulations.

IV. KU NOx Program (Brown 3)

A. Safety

No issues to Report

B. Schedule

On plan for spring 2012 in-service. Material deliveries ahead of plan.

C. Budget

No material change.

D. Issues/Risks

Permits received.

V. Trimble County Coal Combustion Residuals

A. Safety

No issues to Report

B. Schedule

See Issues/Risks below. Submitted 401/404 permit applications on 12/21/10. Detail engineering for landfill awarded to GAI.

C. Budget

No Material Change

D. Issues/Risks

Holcim contract for beneficial reuse executed.

VI. Ghent Coal Combustion Residuals

A. Safety

No Issues to Report

B. Schedule

All permit applications submitted. Detail engineering of CCR Transport System awarded to B&V with final conceptual design expected in March 2011.

C. Budget

Current projected cost for CCR Transport System considerable higher than 2010 MTP estimates which were preliminary and not based on Level I Engineering. Verifying scope and cost estimate.

D. Issues/Risks

Meeting on site disposal needs is a schedule concern based on timeline associated land acquisition, permitting, and engineering/construction. CCN issued December 23, 2009.

Negotiations with last landowner nearing completion, however work continues on condemnation proceedings in the event negotiations are unsuccessful.

VII. Cane Run Coal Combustion Residuals

A. Safety

No issues to Report

B. Schedule

404 and Special Waste Landfill permit applications submitted to KY Division of Water and KY Division of Waste Management, respectively. Received 401 permit on August 4, 2010.

C. Budget

No Material Change

D. Issues/Risks

Evaluating constructing a smaller landfill versus modifying the existing landfill and trucking balance of CCR to Mill Creek based on pending environmental regulations.

Energy Services - Bi-Weekly Update
PROJECT ENGINEERING
January 14, 2011

- **KU SO_x**

- Safety – NTR
- Schedule/Execution:
 - Ghent Elevators – in progress.
 - Ghent Misc. - Fluor demobilized in December. Two Fluor engineers returned to the site to oversee ID Fan Testing which is taking place the week of January 10, 2011.
 - Brown Unit 2 - ID fan and damper control implementation was completed during the last week of the outage as planned and scheduled.
 - Brown Gypsum - De-watering continues
 - Brown Coal Pile Modification – in progress.

- **TC2**

- Safety – NTR
- Schedule/Execution:
 - Bechtel EPC – Performance Guarantee Tests (on restricted coals) were completed 12/23/10. Bechtel’s preliminary results indicate all guaranteed values for thermal performance and air emissions were met for Final Completion except for ammonia consumption, which met the Substantial Completion guarantee value. The preliminary results also indicate the Net Electrical Output Guarantee was surpassed by about 10 MW and Bechtel will qualify for the maximum performance bonus of \$6M if major changes to the combustion system are not performed during the amendment period. PE officially rejected Bechtel’s petition for Substantial Completion because the work is not complete with respect to the burners and the ammonia forwarding system. An Amendment to the EPC Agreement is being negotiated with Bechtel that allows care, custody, and control of the unit to transfer to Owners while suspending delay LD’s to Bechtel while Bechtel completes the burner and ammonia forwarding system work. The Amendment reserves our rights to LD’s, warranty, performance, risk of loss, among other key business points, during this Interim Operation period.
- Contract Disputes/Resolution:
 - Bechtel completed a wire transfer of LD payments totaling just over \$25.6M on 1/12/11. This represents the undisputed amount of our \$38.1M demand letter for LD’s accumulated through 11/20/10.
 - Finalization of the Amendment is targeted for week of Jan 10.
- Issues/Risk:
 - Design of the DBEL burners for our coal specification
 - Completion of the ammonia forwarding system.
 - Long-term life of the coal mill gearbox bearings.

- **Brown 3 SCR**

- Safety – NTR
- Permitting – NTR
- Engineering – proceeding as planned to support the spring 2012 in-service.
- Schedule/Execution – SCR ductwork deliveries nearly complete.

- Issues/Risk – NTR
- **Ohio Falls Rehabilitation**
 - Safety – Received and reviewing Voith Hydro Health and Safety Plan
 - Engineering
 - Voith Hydro proceeding with equipment orders and pre-mobilization issues for a restart of rehabilitation on Unit 5 in June, 2011.
 - RFQ for underwater repairs to Unit 5 gate slots to be out by Monday, 1/17.
 - B&V continues engineering on gate modifications; RFQ expected to be out in early February.
 - Continued review and edit of Aquarius Marine’s submittal of underwater inspection report for entire plant as required by FERC.
 - PE reviewing potential change in SOW for possible 240/480 VAC station auxiliary system upgrade.
 - PE completed work with Voith (VHMS) generator group on application for grid interconnection; information forwarded.
 - PE continues assembling SOW documents for Historic Maintenance Plan repairs to concrete building façade.
 - Issues/Risks
 - NTR
- **Mill Creek Limestone Project**
 - Safety - NTR
 - Schedule/Execution
 - East and Westbrook nearing completion of the building erection. Final work will take place the week of 1/10/11 with a punch list walk-down scheduled for 1/18/11.
 - Detailed Engineering - The award recommendation has been signed and notifications to the successful and non-successful bidders are in progress.
- **Cane Run CCP Project**
 - Permitting
 - 404 and Landfill Permit applications remain under review by the agencies. To date permitting process has gone well. The 401 permit was received on 8/4/10. The Flood Plain permit was received 11/22/10.
 - Engineering
 - The review of constructing the smaller landfill versus modifying the existing landfill and trucking balance of CCR to Mill Creek is nearing completion. Preliminary results indicate no financial benefit to NOT building the landfill; however, while cons exist for long-term trucking to Mill Creek (i.e. Safety, emissions off of trucks, bad weather handling, etc.) there are pros as well with regards to local issues. Initial review held with Bowling and a final review held with Bowling and Voyles. Currently looking at a third alternative, MSE wall around existing landfill to determine if it’s a viable option. Review meeting planned for 2/14/11.
 - Finalization of construction drawings are on hold until the KYDWM permit review is completed and any necessary changes can be incorporated.
 - Working on finalizing design, currently 60% complete, of the smaller landfill to support the proposed 2016 CCGT. A revised estimate for the smaller landfill has been completed by STANTEC and is under review with PE. The revised estimate is lower than the 2011 MTP amount that was a prorate from the original landfill scope.

- **Trimble Co. Barge Loading/Holcim**
 - Finalized order with UCC to purchase pneumatic Fly Ash handling system.
 - The permit has been published on the USACE's website.
 - Received 401 Stream Crossing permit on 20-Dec-10.
 - Working to issue BOP engineering contract.

- **TC CCP Project – BAP/GSP**
 - Safety – NTR
 - Schedule/Execution:
 - GSP's liner system installation completed. Placement of ballasting water for the liner was completed on 1/10/11. Preparations are now being made to set the GSP Raft.
 - All fill and mechanically stabilized earth wall work on the BAP is completed except for a small section of the South Dike. Work continues on erection of the new Pipe Rack, electrical duct banks to GSP Electrical Building and to Ash Pond Raft.
 - Actions being taken to prevent deer from entering the GSP. Fencing was completed at the GSP on 1/7/11.
 - Contract Disputes/Resolution
 - Minor issues to resolve with Riverside.
 - IC approved \$4.2m increase in Riverside contract authorization.
 - Issues/Risk
 - Weather remains the biggest risk; however, the weather over the last 4 months has been exceptional for this project.

- **TC CCP Project – Landfill**
 - Engineering
 - Detailed Engineering in progress with GAI.
 - Drill crews continue the geotechnical exploration.
 - Permitting:
 - The 401 Permit Application was submitted to the Kentucky Division of Water on 12/10/10.
 - The 404 Permit Application was submitted to the US Army Corps of Engineers on 12/21/10.
 - The final review with MACTEC and Environmental Affairs occurred 12/9/10 along with meetings with Legal and Right of Way on potential acquisition of small land parcels for right of ways and stream mitigation.

- **Ghent CCP Projects - Landfill**
 - Safety – NTR
 - Engineering:
 - Detailed Engineering of gypsum fines continues with B&V.
 - Issued tank foundation contract to E&W.
 - Detailed Engineering of the CCR Transport System awarded to B&V. The first conceptual scope meeting is scheduled for 1/17/11 to finalize the conceptual scope of the transport and handling systems.
 - Drawings and Specifications for the Detailed Engineering for the Landfill have been submitted for review within EON-US.
 - Permitting:
 - **All permit applications have been submitted.**
 - Miscellaneous

- Issues/Risk:
 - Land Acquisition – A meeting was held in LG&E Building on 12/17/10 with the remaining land owner’s counsel (Mr. Crawford) and the Deatons. A final offer will be submitted to Deatons counsel the by mid-January that positions them to accept the offer or we move to condemnation

- **E.W. Brown Ash Pond Project**
 - Safety – NTR
 - Issues/Risk:
 - Continue to work with Summit on contract settlement payout/resolution.
 - Engineering – Detailed Engineering in progress by MACTEC.
 - Schedule/Execution:
 - All work in the field is currently related to the Aux. Pond Scope of Work.
 - Placement of Gypsum on hold for favorable weather conditions. Gypsum will be stockpiled instead of sluicing to Aux Pond.
 - Continue to provide BR Landfill design information to MACTEC.
 - BR Landfill design Kick-Off was held on 1/11/11.

- **SO3 Mitigation (Mill Creek 3, Mill Creek 4, Brown 3, Ghent)**
 - Safety – NTR
 - Schedule/Execution – all projects essentially on hold until resolution of Ghent with EPA and Air Compliance planning with B&V study nears finalization in 1Q of 2011.
 - Next EPA discussion with respect to Ghent is the week of January 17th.
 - Planning further testing at Brown in conjunction with FGD Performance Testing utilizing high sulfur coal in March.

- **Cane Run CCGT**
 - Gas Pipe Line Routing – EMS has submitted and LGE has commented on a gas pipeline Routing Report. Planning second phase of design and engineering considering EMS for continued effort on this project.
 - Owner’s Engineer – HDR awarded \$200k to begin OE efforts. Preparing IC paper for February to increase AIP to \$5.5m to cover continued development efforts including full release of OE. Held NGCC primer to further educate Operations, EA, PE, Generation Planning on the CR7 design basis. Booked NGCC technology plant due diligence trips for the week of 1/24/11.
 - Sound Survey –. Survey complete and distributed. Note concerning results from survey.
 - Set-back Survey of Neighbors at Cane Run – OE has submitted new layout meeting the 2000’ foot residential setback requirements.
 - Start Up Emissions – Preparing all heat balances and emissions based on 640 net MW 1% summer design condition which equates to 690 net MW winter condition. Planned kickoff meeting with Trinity on week of 1/31/11.

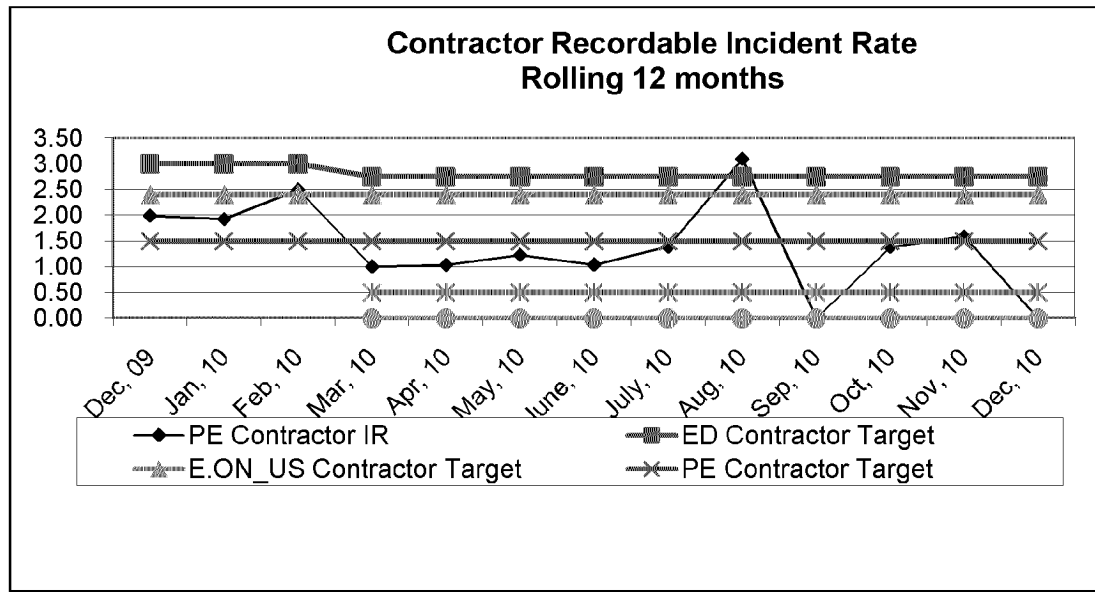
- **Other Generation Development**
 - LFG - NTR.
 - Biomass – BCAP rules promulgated. Working to complete forms for submittal.
 - CCS 100 MW Project –
 - EPRI questionnaire released to 13 technology suppliers; response date January 31st.
 - KGS ongoing. 1 set of geology data under contract. Negotiating licensing agreement for 2nd set of data.
 - KBR under contract. Site visit planned for week of January 17th.

- FutureGen –Surface Team completed evaluations on schedule.

- **General**

- Environmental Scenario Planning:
 - All stations (MC, Ghent and Brown) are under review.
 - Various meetings being held with Gen Planning, Rates & Regulatory to continue honing the plan and various compliance scenarios.
 - SCRs not in plan for Hg co-benefit. This will lead towards several (if not all but Ghent 2) SCRs not being needed, pending final allowance allocation by EPA.
- 2011 MTP ECR/CCN Filings – working closely with Rates on PSC submittals and presentations/updates. **A filing date has been preliminarily set with Rates for April 1 2011.**
- Continue to work with Legal and EA on Ghent SAM compliance.
- Continue to work with Legal on asbestos litigation regarding construction of TC1.

Metrics



PE finished 2010 with an IR of 1.49, just under the goal of 1.50.

Upcoming PWT Needs:

Project Engineering Investment Committee Schedule					INVESTMENT COMMITTEE SCHEDULE												
Project Manager	Description	Contract, Project	Amount	Month of I/C Meeting	SEP10	OCT10	NOV10	DEC10	JAN11	FEB11	MAR11	APR11	MAY11	JUN11	JUL11	Aug11	
					SSA	\$000s											
HeurCR	CCP - Landfill Phase I - Construction	C	15,000	Aug													█
HeurGH	CCP - Landfill Phase I - Construction	C															
HeurGH	CCP - Gypsum Fines and Transport - Engineering	C	4,000	Oct	█	█											
HeurGH	CCP - Gypsum Fines and Transport - Equipment	C															
HeurGH	CCP - Biannual Update	C															
ImbeBR	3 SAM Mitigation	C	8,000	Dec				█	█	█							
ImbeGH	1 - 4 SAM Mitigation	P	32,000	Dec				█	█	█							
ImbeMC	3 and MC4 SAM Mitigation -	P															
ImbeB	Biomass Coal Firing																
ImbeL	and Fill Gas Engineering																
Lively	CCGT 2015 - Cane Run	P	589,200	Apr								█	█				
SaundL	Limestone Mill EPC Contract	C	12,000	Dec				█	█	█							
SaundBR	2 SCR Technology	P															
SaundBR	2 SCR EPC	P															
SaundBR	2 SCR Technology	P															
SaundBR	2 SCR EPC	P															
WaterW	CCP - Landfill Phase I - Construction	C															
WaterW	CCP - Gypsum Fines and Transport - Engineering	C															
WaterW	CCP - Gypsum Fines and Transport - Equipment	C															
WilliaBR	CCP - Landfill	P	66,000	Oct	█	█											
WilliaBR	CCP - Landfill Phase I - Construction	C															
WilliaBR	CCP - Ash Handling Dry Conversion	C															█

Staffing

- Significant staffing increases in PE expected to manage the current slate of projects in PE’s 2011 MTP and to account for retirements. Headcount planning is in process now that the MTP has been approved by LG&E and KU Energy. The revised PE headcount plan is expected to be in final draft in January 2011.
- The new position to manage project approval documentation and schedules is expected to be posted within two weeks. The position description is under final review with HR.

Energy Services - Bi-Weekly Update
PROJECT ENGINEERING
January 28, 2011

- **KU SOx**
 - Safety – NTR
 - Schedule/Execution:
 - Ghent Elevators – in progress.
 - Brown FGD - BPEI is performing Optimization Testing in preparation for Performance Testing scheduled in March.
 - Brown Coal Pile Modification – in progress enable storage of a portion of the fuel for FGD Performance Testing.
 - Brown Elevators – nearing completion.

- **TC2**
 - Safety – NTR
 - Schedule/Execution:
 - Bechtel EPC – An Amendment No. 2 to the EPC Agreement was finalized Jan 21st with Bechtel which allowed care, custody, and control (CCC) of the unit to transfer to Owners at 00:00.00 EST on Jan 22nd while suspending delay LD's to Bechtel while Bechtel completes the burner and ammonia forwarding system work. The Amendment reserves our rights to LD's, warranty, performance, risk of loss, among other key business points, during this Interim Operation period.
 - Contract Disputes/Resolution:
 - Bechtel LD's – PE sent a letter to Bechtel demanding the remaining LDs through January 14th per the Amendment. The letter also recommended a meeting to begin discussions to close the outstanding LD payments.
 - Issues/Risk:
 - Design of the DBEL burners for our coal specification
 - Completion of the ammonia forwarding system.

- **Brown 3 SCR**
 - Safety – NTR
 - Permitting – NTR
 - Engineering – proceeding as planned to support the spring 2012 in-service.
 - Schedule/Execution – SCR ductwork deliveries nearly complete, well ahead of Zachry's needs.
 - Issues/Risk – NTR

- **Ohio Falls Rehabilitation**
 - Safety – NTR
 - Engineering
 - Voith Hydro proceeding with equipment orders and pre-mobilization issues for a restart of rehabilitation on Unit 5 in June, 2011.
 - Held pre-bid for underwater repairs to Unit 5 gate slots.
 - B&V continues engineering on gate modifications; RFQ expected to be out in early February.
 - Continued review and edit of Aquarius Marine's submittal of underwater inspection report for entire plant as required by FERC.

- PE committed to upgrade the station auxiliary system to 480VAC.
 - PE continues assembling SOW documents for Historic Maintenance Plan repairs to concrete building façade.
- **Mill Creek Limestone Project**
 - Safety - NTR
 - Schedule/Execution
 - East and Westbrook are scheduled to leave the site on Jan. 28th with the completion of the building extension.
 - Petrochem will mobilize to the site on January 27th to add insulation to the maintenance portion of the new building.
 - Detailed Engineering - Engineering kickoff with HDR held at Mill Creek on January 19th.
- **Cane Run CCP Project**
 - Permitting
 - All permitting proceeding well with the 401 Permit and Flood Plain permit being received in 2010.
 - Engineering
 - The review of constructing the smaller landfill versus modifying the existing landfill and trucking balance of CCR to Mill Creek is nearing completion. A follow-up review meeting planned for 2/14/11.
 - Finalization of construction drawings are on hold until the KYDWM permit review is completed and any necessary changes can be incorporated.
 - Working on finalizing design, currently 60% complete, of the smaller landfill to support the proposed 2016 Cane Run 7.
- **Trimble Co. Barge Loading/Holcim**
 - Finalized order with UCC to purchase pneumatic Fly Ash handling system.
 - The 404 permit has been issued by the USACE.
 - Received 401 Stream Crossing permit on 12/20/10.
 - Working to issue BOP engineering contract.
- **TC CCP Project – BAP/GSP**
 - Safety – NTR
 - Schedule/Execution:
 - Preparations are now being made to set the GSP Raft.
 - All fill and mechanically stabilized earth wall work on the BAP is completed except for a small section of the South Dike. Work continues on erection of the new Pipe Rack, electrical duct banks to GSP Electrical Building and to Ash Pond Raft.
 - Contract Disputes/Resolution
 - Minor issues to resolve with Riverside. Meetings w/Riverside continues on resolution of claims.
 - Issues/Risk
 - Weather remains the biggest risk.
- **TC CCP Project – Landfill**
 - Engineering
 - Detailed Engineering in progress with GAI.
 - Drill crews have completed the first set of the geotechnical exploration.

- A Pre-Bid Meeting was held on Jan. 24th on the Final Conceptual Engineering on the CCR Transport and Treatment.
 - Permitting:
 - The 401 Permit application was submitted to the Kentucky Division of Water on 12/20/10.
 - The 404 Permit application was submitted to the US Army Corps of Engineers on 12/21/10 with the public notice expected by mid-February.
 - A follow-up meeting was held with Environmental Affairs and Legal and Right of Way 20Jan11 concerning potential acquisition of small land parcels for right of ways and stream mitigation.
- **Ghent CCP Projects - Landfill**
 - Safety – NTR
 - Engineering:
 - Detailed Engineering of gypsum fines continues with B&V.
 - Issued tank foundation contract to E&W.
 - Working on issuing RFQ for Civil/Mechanical Construction.
 - Detailed Engineering of the CCR Transport System awarded to B&V. The first conceptual scope meeting is scheduled for 1/17/11 to finalize the conceptual scope of the transport and handling systems.
 - Drawings and Specifications for the Detailed Engineering for the Landfill have been submitted for review within.
 - Permitting:
 - **All permit applications have been submitted.**
 - Issues/Risk:
 - Land Acquisition – Negotiations nearing completion with Deaton family in regards to pricing and terms of sale. Work continues, however, on condemnation proceedings with the preparation of the drawings to delineate the actual “takings.” The McDole and Owens property is complete.
- **E.W. Brown Ash Pond Project**
 - Safety – NTR
 - Issues/Risk:
 - Continue to work with Summit on contract settlement payout/resolution.
 - Engineering – Detailed Engineering in progress by MACTEC.
 - Schedule/Execution:
 - All work in the field is currently related to the Aux. Pond Scope of Work.
 - Placement of Gypsum on hold for favorable weather conditions. Gypsum will be stockpiled instead of sluicing to Aux Pond.
 - Continue to provide BR Landfill design information to MACTEC.
 - PE and Mactec to meet with KYDWM on 1/27 (EA also to attend).
 - Currently developing RFQ for conceptual design engineering of Wet-to-Dry Ash Handling conversion as part of the BR Landfill project.
- **SO3 Mitigation (Mill Creek 3, Mill Creek 4, Brown 3, Ghent)**
 - Safety – NTR
 - Schedule/Execution – all projects essentially on hold until resolution of Ghent with EPA and Air Compliance planning with B&V study nears finalization in 1Q of 2011.
 - Further testing at Ghent scheduled for the week of January 31. Planning further testing at Brown in conjunction with FGD Performance Testing utilizing high sulfur coal in March.

• **Cane Run CCGT**

- Gas Pipe Line Routing – EMS gas pipeline Routing Report finalized. Gas Engineering has agreed to manage the conceptual design and estimate for the gas supply to CR7 and will evaluate synergies to other needs of Gas Department in the area of CR.
- Owner’s Engineer – IC paper slated for February to increase authorization to \$5.5m to cover continued development efforts including full release of OE.
- Set-back Survey of Neighbors at Cane Run – Refinements made to the general arrangement have satisfied setback requirements.
- Start Up Emissions – All heat balance options released to Generation Planning for modeling.
- NGCC Due Diligence Trip – Visited 2 Siemens and 2 GE combined cycle sites to lessons learned and operational intelligence on the major equipment.

• **Other Generation Development**

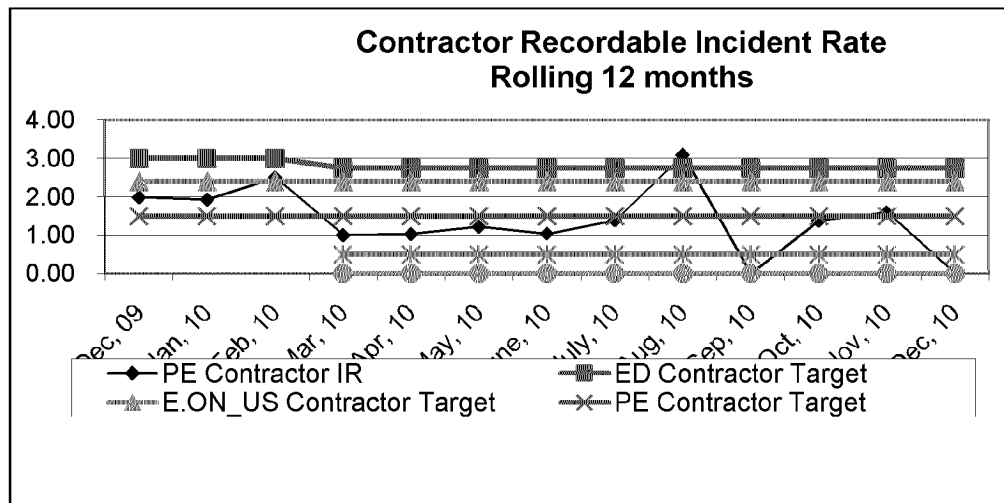
- Biomass – BCAP rules promulgated. Working to complete forms for submittal.
- CCS 100 MW Project –
 - Continued communication with technology suppliers as they work to complete the questionnaires by January 31st.
- FutureGen –Surface Team performed re-evaluation of sites. Reviewed the Alliance Agreement.

• **General**

- Environmental Scenario Planning:
 - All stations (MC, Ghent and Brown) are under review.
 - Various meetings being held with Gen Planning, Rates & Regulatory to continue honing the plan and various compliance scenarios.
 - SCRs not in plan for Hg co-benefit. This will lead towards several (if not all but Ghent 2) SCRs not being needed, pending final allowance allocation by EPA.
- 2011 MTP ECR/CCN Filings – working closely with Rates on PSC submittals and presentations/updates. **A filing date has been preliminarily set with Rates for April 1 2011.**
- Continue to work with Legal and EA on Ghent SAM compliance.
- Continue to work with Legal on asbestos litigation regarding construction of TC1.

Metrics

PE finished 2010 with an IR of 1.49, just under the goal of 1.50.



Upcoming PWT Needs:

Project Engineering Investment Committee Schedule				INVESTMENT COMMITTEE SCHEDULE												
Project Manager	Description	Contract, Project Amount	Month of I/C Meeting	SEP1	OCT1	NOV1	DEC1	JAN1	FEB1	MAR1	APR1	MAY1	JUN1	JUL1	Aug1	
HeurCR	CCP - Landfill Phase I - Construction	C 15,000	Aug													
HeurGH	CCP - Landfill Phase I - Construction	C														
HeurGH	CCP - Gypsum Fines and Transport - Engineering	C 4,000	Oct	█	█											
HeurGH	CCP - Gypsum Fines and Transport - Equipment	C														
HeurGH	CCP - Biannual Update	C														
ImbeBR	3 SAM Mitigation	C 8,000	Dec				█	█	█							
ImbeGH	1 - 4 SAM Mitigation	P 32,000	Dec				█	█	█							
ImbeMC	3 and MC4 SAM Mitigation - Construction	P														
ImbeB	Biomass Coal Firing															
ImbeL	and Fill Gas Engineering															
LivelyC	CGT 2015 - Cane Run	P 589,200	Apr													
SaundL	Limestone Mill EPC Contract	C 12,000	Dec				█	█	█							
SaundBR	2 SCR Technology	P														
SaundBR	2 SCR EPC	P														
SaundBR	2 SCR Technology	P														
SaundBR	2 SCR EPC	P														
WaterW	CCP - Landfill Phase I - Construction	C														
WaterW	CCP - Gypsum Fines and Transport - Engineering	C														
WaterW	CCP - Gypsum Fines and Transport - Equipment	C														
WilliaBR	CCP - Landfill	P 86,000	Oct	█	█											
WilliaBR	CCP - Landfill Phase I - Construction	C														
WilliaBR	CCP - Ash Handling Dry Conversion	C														

Staffing

- Headcount planning is in process to evaluate staffing needs to manage the 2011MTP projects.

From: Jackson, Fred
To: Thompson, Paul
Sent: 3/14/2011 9:46:50 AM
Subject: RE: ECR filing
Attachments: Work Plan 03102011 - 2011 Plan.docx

Paul,

See attached work plan. Please let me know if questions.

Thanks.
Fred

From: Thompson, Paul
Sent: Friday, March 11, 2011 10:07 AM
To: Jackson, Fred
Subject: ECR filing

Fred,

Do you have a current list by project of what is anticipated to be in the next ECR filing?

Paul

2011 Amended ECR Plan / CCN Filing

Kentucky Utilities Company (KU) and Louisville Gas & Electric Company (LG&E) plan to file an application to amend their respective ECR plans by April 1, 2011. Simultaneously KU will file an application (one ECR/CCN application) for Certificates of Public Convenience and Necessity (CCN) for the construction of Air Compliance projects at Brown and Ghent and modification of the Brown Ash Pond to a Landfill. LG&E will also simultaneously file an application (one ECR/CCN application) for CCNs for the construction of Air Compliance projects at Mill Creek and Trimble County.

ECR Projects included in 2011 Amended Plan

KU

Project 34 - Brown Station – Air Compliance

- Required to comply with existing opacity limits and PSD rules, proposed HAPS regulations, and compliance with consent decree requiring Brown 3 SCR
 - Baghouse with PAC Injection – shared between Units 1 and 2
 - Baghouse with PAC Injection – Unit 3
 - SAM Mitigation – Units 1 and 2
- Project cost forecast is \$177.46M and will have associated O&M
- Baghouses will require a CCN

Project 35 – Ghent Station – Air Compliance

- Required to comply with proposed CATR and HAPS regulations, opacity limits, compliance with consent decree expected in early fall
 - Baghouse with PAC Injection – all four units
 - SCR modifications – Units 1, 3, 4
- Project cost forecast is \$679.58M and will have associated O&M
- Baghouses will require a CCN

Amended Project 24 – Sorbent Injection (SAM Mitigation)

- Required to comply with proposed CATR and HAPS regulations, opacity limits, compliance with consent decree expected in early fall
 - SAM Mitigation – Ghent Units 1, 2, 3, 4
- Project cost forecast is \$8M and will have associated O&M
- Original Project 24 did not include Ghent Unit 2; amended project will include Unit 2
- Project does not require a CCN

Amended Project 29 – Brown Station Landfill

As part of the approved 2009 ECR Plan, Project 29 included Phase II of the Main Pond and Aux Pond Expansion. With the 2011 ECR Plan filing, the recommendation is to amend Project 29 to include dry storage instead of the approved wet storage.

- Required to comply with proposed Coal Combustion Residuals regulations

- Multi-phase project will maximize future vertical expansion opportunities and reduce final landfill height by using original Ash Pond footprint
- Phase I anticipated in-service by January 2014
- Phase I project cost forecast is \$57.12M; total project cost forecast is \$154.94M, and will have associated O&M
- Landfill does not require a CCN

LG&E

Project 26 – Mill Creek Station – FGDs

- Required to comply with NAAQS and Jefferson County Non-Attainment
 - FGD Upgrades – Units 1 and 2
 - New FGD – Unit 4
 - Update and tie-in existing Unit 4 FGD to Unit 3
 - Ammonia – Unit 4 (relocation of existing facilities)
- Project cost forecast is \$490.51M and will have associated O&M
- FGDs will require a CCN

Project 27 – Mill Creek Station – Air Compliance

- Required to comply with proposed CATR and HAPS regulations
 - Baghouse with PAC Injection – all four units
 - SCR modifications – Unit 3 and 4
 - SCR Upgrade – Unit 4
- Project cost forecast is \$510.12M and will have associated O&M
- Baghouses will require a CCN

Project 28 – Trimble County Unit 1 – Air Compliance

- Required to comply with proposed CATR and HAPS regulations
 - Baghouse with PAC Injection
- Project cost forecast is \$166.09M and will have associated O&M
- Baghouses require CCN

Work Plan

Identify Eligible ECR Projects	On-going
Begin drafting application and testimony	January 31, 2011
Exhibits supporting application and testimony due to Rates	April 8, 2011
Least cost analysis / Cost justification	April 15, 2011
1 st Draft of Application and Testimony to be circulated	April 18, 2011
Finalize Revenue Requirements/Bill Impact Analysis of eligible projects	April 22, 2011

2 nd Draft of Application and Testimony to be circulated	April 28, 2011
File a “Notice of Intent” with KPSC (30-days prior to filing)	May 2, 2011
3 rd Draft of Application and Testimony to be circulated	May 6, 2011
Submit KU and LG&E newspaper notice of proposed tariff changes and estimated bill impact (21 days prior to filing)	May 11, 2011
Final Draft of Application and Testimony to be circulated	May 13, 2011
Final Reviews	May 18, 2011
File KU CCN/ECR Application and LG&E CCN/ ECR Application with the KPSC	June 1, 2011

Witness Listing and Subject Matter

Witness: Lonnie E. Bellar

- Support/Contact: Andrea Schroeder
- Subject Matter: CCN and ECR
 - Overview of the applications
 - Introduction of Company witnesses & testimony
 - Reasons for requesting CCN
 - Reasons for ECR projects
 - Requested Rate of Return (10.63% in accordance with Rate Case assumption)
 - Project financing

Witness: John Voyles

- Support/Contact: Eileen Saunders (Projects); Mike Winkler and Gary Revlett (Environmental)
- Subject Matter: CCN and ECR
 - Engineering studies supporting the cost and construction for the environmental projects
 - Overview of the projects contained in the ECR Plan
 - Detailed discussion of each project contained in the ECR Plan
 - Any O&M savings associated with projects
 - Any incremental O&M cost to be recovered
 - Any retirements resulting from new projects
 - Why the projects are needed
 - Ghent NOV Consent Decree status (SAM Mitigation)

- Discussion of environmental regulation requiring additional compliance measures including the Clean Air Act Amendments (CAAA)
- Specific Environmental laws and/or regulations that require each of the Projects included in the ECR filing
- Status of environmental permits/requirements for each project, as necessary

Witness: Chuck Schram

- Support/Contact: Stuart Wilson
- Subject Matter: CCN and ECR
 - Least cost analyses for environmental compliance
 - Project cost justification
 - Cost support as needed for each project contained in the ECR Plan
 - Accuracy/confidence of cost estimates

Witness: Shannon Charnas

- Support/Contact: Eric Raible
- Subject Matter: ECR Only
 - Explanation of the Company's reporting and accounting of the O&M expenses associated with the projects contained in the plan
 - Discussion of the level of expenditures already included in existing rates

Witness: Robert M. Conroy

- Support/Contact: Andrea Schroeder
- Subject Matter: ECR Only
 - Discussion of Customer bill impact
 - Increase due to ECR projects
 - Presentation of forms for ECR filings

Overall Risks/Issues associated with the Filing

- ECR Legislation under KRS 278.183
- Significant cost overruns for project construction of prior approved projects
- Ghent NOV Consent Decree (SAM Mitigation)
- Lack of final regulations adds uncertainty to the need for and scope of the projects

- Commission could grant a CCN and deny ECR recovery until a future compliance plan or rate case
- Previous compliance plan results
- New Commission and PSC staff turnover

From: CHRIS.GARRETT@LGE-KU.COM
To: Thompson, Paul
Sent: 3/23/2011 5:39:01 PM
Subject: AIP Project Approval - 131693 - REVISION
Attachments: 2011 MTP Level I Engineering - Air Compliance Projects.docx; 131693-18.pdf; AIP Combining Mercury and Air.docx

LG&E project number 131693 (Envir Compliance Study-Air-LGE) has been submitted for your approval. Please login to PowerPlant and respond to the items awaiting your approval.

[login to powerplant](#)

Investment/Contract Proposal for IC: e-mail vote on 8/27/10

Project Name:	MTP Engineering – Air Compliance Projects	
Total Expenditures:	\$2,000K	
Sole Source Amount:	\$1,600K	
Project Number:	131693 – LG&E	131694 - KU
Business Unit/Line of Business:	LG&E and KU Coal-Fired Generation	
Prepared/Presented By:	Eileen Saunders/Scott Straight	

Executive Summary

This request seeks authorization of \$2,000K to continue refining the scopes, implementation schedules and cost estimates of projects identified in the development of the 2011 MTP as necessary for compliance with proposed or final local, State and Federal air compliance regulations through 2016.

In addition to requesting approval of a new engineering project that will continue refining the 2011 MTP air compliance scope, this request also seeks approval of a sole source award to Black & Veatch (B&V) engineering firm. B&V will perform the majority of studies included in the \$2 million project sanction request; however, smaller valued contracts will be awarded to various technology firms to perform miscellaneous reviews of the LG&E and KU existing air pollution control technologies for potential upgrades to their performance.

Background

Starting this year and continuing for the next two years, the United States Environmental Protection Agency (USEPA) will be developing and implementing several new environmental regulations. These new regulations will significantly impact our coal-fired electric generating units and will affect all environmental areas of air, water and land. The pollutants targeted in three of the new air regulations are SO₂ and NO_x. There is a recent new 1-hour National Ambient Air Quality Standard (NAAQS) for SO₂ and NO_x that will require lower emission rates at several of the stations and the CAIR rule is proposed to be replaced by a new Clean Air Transport Rule (CATR). Each will require additional reductions in SO₂ and NO_x. In 2011, the USEPA is expected to propose and finalize an Electric Utility Maximum Achievable Control Technology Rule (MACT). The MACT rule will require significant reductions in hazardous air pollutants such as mercury and acid gases (i.e., SO₃/H₂SO₄ emissions) which are also emitted from the LG&E and KU coal-fired electric generation fleet.

In May of 2010, Project Engineering was asked to investigate the technological and financial impacts of new environmental air regulations on the KU and LG&E coal-fired units. B&V was hired through a competitive bid process at a contract valued at \$149K and given six weeks to provide a high level estimate based on site visits, data collection from the plants and industry experience. As a result of this Phase I effort, approximately \$3 billion (escalated) of Air

Emissions Mitigation System additions and retrofits were identified as possible scenarios for bringing the fleet into compliance with the projected standards.

Through the approval of this investment/contract proposal, B&V will be contracted with to continue with Phase II of the engineering and estimating effort. This effort will provide a facility-specific project definition consisting of conceptual designs and budgetary cost estimates for selected air quality control technologies. This effort will result in a Level 1 Engineering assessment for Mill Creek, Ghent and EW Brown. The work for each facility will be staggered with the Mill Creek effort commencing first.

Award of the Phase II work to B&V will provide continuity to the initial study work. The contract will be on a time and material basis, not-to-exceed sole source contract, with a value of \$1.6M. Black and Veatch will keep their original team in place to gain efficiencies for the Phase II work. The scope of their work will include activities/deliverables such as the following:

- Kick-Off Meetings at each facility
- Conceptual Design
- Building and Plant Arrangements
- Technology Screening
- Constructability Plans
- Project Cost Estimates including Cash Flows
- Refined Implementation Schedules

The remainder of the investment funding will cover costs of internal labor and expenses and the use of other external engineering /construction firms to review existing air pollution control technology performance enhancement options. Two examples of this would be hiring Riley Power (the original SCR technology firm) to review/model NO_x emission reduction improvements on the existing Mill Creek 4 SCR that they originally design in 2002 and their review of improvements to the Mill Creek FGDs similar to the improvements they designed for TC1's FGD improvements as part of the TC2 Project.

Project timeline:

Level I Engineering	Begin	Complete
Mill Creek	August 2010	March 2011
Ghent	October 2010	April 2011
Brown	January 2011	May 2011

Economic Analysis and Risks

No economic or risk analyses have been performed as this request seeks only sanction to continue refining and developing the scopes, schedules and cost estimates for projects throughout the coal-fired fleet within LG&E and KU to comply with pending air regulations. Each project identified in this continuance of studies will seek sanction independent of this sanction and thus will have economic and risk analyses performed specifically for each project or coal-fired unit.

Assumptions

Assumptions that will be used as a basis for the continuance of analyses performed within this sanction are the Energy Services 2011 MTP Assumptions. The primary assumptions are described in the Background section above.

Financial Summary (\$000s)

None performed. This sanction will be capitalized and spread pro-rata across the air compliance projects that are sanctioned in the future.

Cash Flow Comparison (\$000s)

Project Expenditures (\$Millions)	2010	2011	Total
2010 MTP/LTP	\$0.0	\$0.0	\$0.0
Current Proposal	\$.75	\$1.25	\$2.0

Sensitivities

None performed.

Risks

The 2011 draft MTP includes approximately \$3 billion in air compliance projects identified with scope identification, schedules and cost estimates based on minimum (much less than Level I Engineering) engineering analyses. Disapproving this sanction will result in the continuance of generation planning for compliance with pending or proposed air regulations with scopes, schedules and estimates that have a significant margin of error.

Other Alternatives Considered

None

Conclusions and Recommendation

It is the recommendation of Project Engineering and Power Production to approve the continuance of studying and analyzing the scopes and options necessary to comply with pending or proposed air compliance regulations for the KU and LG&E coal-fired generating units. The continuance of these studies will lead to better definition of scopes, implementation schedules and cost estimates of major capital projects to comply with the air regulations that will be incorporated into the 2011 and 2012 MTP plans. Approval is also requested to award B&V a sole source award for \$1.6 million on a time-and-material basis for Phase II of the Air Compliance portion of the 2011 MTP.

Eileen Saunders
Manager Major Capital Projects

Scott Straight
Director Project Engineering

John Voyles
VP Transmission & Gen. Services

Ralph Bowling
VP Power Production

Paul Thompson
SVP Energy Services

Brad Rives
Chief Financial Officer

Victor Staffieri
Chief Executive Officer

AUTHORIZATION FOR INVESTMENT PROPOSAL - REVISION

 LG&E and KU Services Co. Louisville Gas and Electric Co. Kentucky Utilities Company

Name of Project: Envir Compliance Study-Air-LGE		Funding Project Type: LGE Steam NonBlnk Excluding Land	
Date Requested: 8/5/2010	Project Number: 131693	Budgeted: no	
Related Project Numbers: 131694		If unbudgeted, list alternate budget ref. Number(s): Approved by Investment Committee on 9-3-10	
Expected Start Date: 1/1/2010	Expected In Service Date: 1/1/2014	Expected Completion Date: 3/31/2014	
AIP Prepared by: Mooney, Michael Allen		Phone: 502/627-3671	
Project Manager: Saunders, Eileen		Phone: 502/627-2431	
Asset Location: Mill Creek Unit 4		Environmental Code: Air	
Resp. Center: 002020-GENERATION SUPPORT - LGE		Product Code: 111 - WHOLESALE GENERATION	

REASONS AND DETAILED DESCRIPTION OF PROJECT

131693-Envir Compliance Study-Air-LGE

Environmental Compliance Studies - Air for Mill Creek

AIP is being increased from \$2.0M to \$2.25M. This is a result of combining the Mercury Compliance Studies with the Environmental Air Studies. The Air Studies were approved by the IC on 9-3-10. It should have included the \$250k for the Mercury Compliance Study (projects 125607 & 125609) actuals that were moved to the Environmental Air Studies (131693 & 131694) in Sept 2010.

AIP is requesting \$2M for Environmental Air Studies for Mill Creek on LGE (36%), Ghent and Brown (64%) on KU. To be going to IC on 8-26-10. Approved by IC on 9-3-10

Costs	Capital Investment	Cost of Removal/ Retirement	Capital Cost Subtotal	Initial O&M Cost	Lifetime Maintenance Cost	O&M Cost Subtotal	TOTAL INVESTMENT
	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Company Labor	\$57,232.01	\$0.00	\$57,232.01	\$0.00	\$0.00	\$0.00	\$57,232.01
Contract Labor	\$2,191,683.36	\$0.00	\$2,191,683.36	\$0.00	\$0.00	\$0.00	\$2,191,683.36
Other	\$1,073.15	\$0.00	\$1,073.15	\$0.00	\$0.00	\$0.00	\$1,073.15
Local Engineering	\$11.48	\$0.00	\$11.48	\$0.00	\$0.00	\$0.00	\$11.48
Subtotal - GAAP	\$2,250,000.00	\$0.00	\$2,250,000.00	\$0.00	\$0.00	\$0.00	\$2,250,000.00
Net Expenditures - GAAP	\$2,250,000.00	\$0.00	\$2,250,000.00	\$0.00	\$0.00	\$0.00	\$2,250,000.00
Net Expenditures - IFRS	\$2,250,000.00	\$0.00	\$2,250,000.00	\$0.00	\$0.00	\$0.00	\$2,250,000.00
2010 Total	\$797,851.62	\$0.00	\$797,851.62	\$0.00	\$0.00	\$0.00	\$797,851.62
2011 Total	\$1,452,148.38	\$0.00	\$1,452,148.38	\$0.00	\$0.00	\$0.00	\$1,452,148.38
2012 Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Approval Type: Non-IT Projects

Authorized by	Amount	Name	Date Approved	Req'd
Supervisor	\$25,000.00			N
Manager	\$100,000.00	Saunders, Eileen	3/9/2011	Y
Budget Coordinator	\$0.00	Ritchey, Stacy	3/9/2011	Y
Budget Coordinator	\$0.00	Mooney, Michael Allen	3/9/2011	Y
Director	\$300,000.00	Straight, Ronald	3/21/2011	Y
Vice President	\$750,000.00	Voyles, John	3/22/2011	Y
Investment Committee Coordinator	\$0.00	Chapman, Laura	3/23/2011	Y
Financial Planning Director	\$0.00	Garrett, Christopher	3/23/2011	Y
Senior Officer	\$1,000,000.00	Thompson, Paul		Y
CFO	\$1,000,001.00	Rives, Stephen		Y
CEO	\$1,000,002.00	Staffieri, Victor		Y
Property Accounting	\$0.00	Rose, Bruce		Y

INVESTMENT MATERIALS

UOP #	Utility Account Id		Quantity	Total Cost	
06677	131100	MISCELLANEOUS STRUCTURES (066	0	\$810,000.00	

RETIRED EQUIPMENT (OR MATERIALS)

UOP #	Utility Account Id		Quantity	Vintage Year	Original Project Number

AIP QUESTIONS**Are there Related Project Numbers?**

Provide related project numbers or indicate 'N/A'.

131694

Is this an IT related project?

IT project is any project that requires IT involvement or the purchase of hardware and software.

no

Purchase/Sale of Real Estate?

Is this a transaction related to the sale/purchase of land or buildings?

no

Budgeted?

Is the project budgeted or unbudgeted?

no

AIP QUESTIONS**Alternate Budget Numbers?**

If the project is unbudgeted, list alternate budget reference numbers. Enter N/A, if none.

Approved by Investment Committee on 9-3-10

Legal Asset Retirement Obligation?

Is there a legal or environmental requirement governing disposal of this asset?

no

Leased Asset?

Does this project involve a leased asset?

no

Obsolete Inventory?

Will this project create obsolete inventory?

no

Environmental Project

Is this an Environmental Project?

yes

Environmental Cost Recovery

If an environmental project, is this an approved environmental cost recovery (ECR) project?

no

ECR Project Type

If this is an ECR project, indicate the project type.

Air

ECR Compliance Number

If this is an ECR project, provide the ECR compliance plan number (see the approved project list on the Rates and Regulatory intranet site).

Not Assigned Yet

Environmental Affairs

Does Environmental Affairs need to review this project for environmental permitting issues (based on responses to the six questions in the Investment Proposal)?

no

Research and Experimental Credit

Is this an experimental project with the purpose of improving, enhancing, or adding to a current manufacturing process?

no

Sales Tax-Pollution Control

Is this project done for environmental regulations or statutes? (If yes, may qualify for the Pollution Control Exemption.)

no

Sales Tax-Manufacturing Integration

Is this project integrated in the Manufacturing Process? (Yes to this question and the following two questions may qualify for the New and Expanded Exemption.)

no

Sales Tax-State Equipment Use

Is this equipment used in the state for the first time?

no

Sales Tax-Upgrade or Improvement?

Is this project considered an upgrade or improvement? If yes, enter description on next line.

no

Sales Tax-Upgrade Description

Description of upgrade, if applicable (i.e., improved materials, increased capacity, longer life, etc.) from prior question. Enter N/A, if not applicable.

N/A

This AIP request is for an additional \$250k for a total of \$2.25M. This request is not for additional money, but rather a combination of projects. The Environmental Air Studies AIP was originally for \$2.0M and was approved by the investment committee in Sept 2010, but did not include the approved Mercury Study dollars. Mercury Compliance Studies was approved by the investment committee in May 2009. These studies were conducted in 2009 and 2010. In Sept 2010, it was decided to combine the Mercury Compliance Studies (125607 & 125609) with the newly approved Environmental Air Studies (131693 & 131694). All charges to the Mercury Compliance projects were moved to the Environmental Air Studies in Sept 2010.

From: Schram, Chuck
To: Thompson, Paul
CC: Sinclair, David; Voyles, John
Sent: 4/13/2011 12:11:41 PM
Subject: Project Calendar
Attachments: Prj Calendar 20110413.pdf

Paul,

Attached is a calendar with the key dates for ECR, RFP, and CCCT (2016 and 2018) development thru 2014. This is sorted by project instead of the prior calendar's combined view. We can extend this calendar's timeframe and include additional project detail if needed.

<<...>>

Chuck

Key Dates

April 13, 2011

	2011									2012	2013	2014
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
ECR												
Complete analysis	15-Apr											
Draft testimony for review	18-Apr											
Finalize bill impacts	22-Apr											
File KPSC notice		2-May										
Submit newspaper notices		11-May										
Final draft ECR appl and testimony		16-May										
File ECR/CCN applications			1-Jun									
Final CATR issued			27-Jun									
EPA releases proposed GHG regs				26-Jul								
ECR order due from KPSC									28-Nov			
Receive final MACT/HAPS rule									30-Nov			
Complete review of MACT/HAPS control plan based on final rule										30-Dec		
RFP												
Bidders deadline for best offer	11-Apr											
Decision on selection of final RFP offer(s)			3-Jun									
Finalize agreement(s) with RFP finalist(s)				29-Jul								
File KPSC notice/CCN						1-Sep						
CCCT (2016 unit)												
Inv Comm/internal approvals		31-May										
Public ROW mtgs for gas pipeline			1-Jun									
Air permit application				1-Jul								
Draft CCN filing				15-Jul								
File CCN						1-Sep						
Prepare Transmission CCN							1-Oct		16-Dec			
Receive CCN and air permit										Q3		
Award eqpt and EPC contract										Q4		
EPC full notice to proceed											Q1	
Eminent domain filings for ROW (if needed)											Q2	
CCCT (2018 unit)												
Identify site acquisition needs										Q4		
Complete plant concept											Q1	
File CCN application												Q3

From: CHRIS.GARRETT@LGE-KU.COM
To: Thompson, Paul
Sent: 6/2/2011 8:43:17 AM
Subject: AIP Project Approval - 131693 - REVISION
Attachments: 131693-30.pdf; Env Air Addtl SSA fund request.docx; Project131693.docx

LG&E project number 131693 (Envir Compliance Study-Air-LGE) has been submitted for your approval. Please login to PowerPlant and respond to the items awaiting your approval.

[login to powerplant](#)

AUTHORIZATION FOR INVESTMENT PROPOSAL - REVISION

 LG&E and KU Services Co. Louisville Gas and Electric Co. Kentucky Utilities Company

Name of Project: Envir Compliance Study-Air-LGE		Funding Project Type: LGE Steam NonBlnk Excluding Land	
Date Requested: 8/5/2010	Project Number: 131693	Budgeted: yes	
Related Project Numbers: 131694		If unbudgeted, list alternate budget ref. Number(s): Approved by Investment Committee on 5-27-11 for additional \$1.0M	
Expected Start Date: 1/1/2010	Expected In Service Date: 1/1/2014	Expected Completion Date: 3/31/2014	
AIP Prepared by: Mooney, Michael Allen		Phone: 502/627-3671	
Project Manager: Saunders, Eileen		Phone: 502/627-2431	
Asset Location: Mill Creek Unit 4		Environmental Code: Air	
Resp. Center: 002020-GENERATION SUPPORT - LGE		Product Code: 111 - WHOLESALE GENERATION	

REASONS AND DETAILED DESCRIPTION OF PROJECT

131693-Envir Compliance Study-Air-LGE

Environmental Compliance Studies - Air for Mill Creek

AIP is requisitioning an additional authorization of \$1.0M to Black & Veatch engineering contract to begin the project specification development and procurement efforts of major equipment necessary to support the Environmental Air Compliance implementation activities. The additional \$1.0 was approved by the Investment Committee on 5-27-11 and will bring the total AIP approval to \$3.25M.

Previous Approvals:

AIP is being increased from \$2.0M to \$2.25M. This is a result of combining the Mercury Compliance Studies with the Environmental Air Studies. The Air Studies were approved by the IC on 9-3-10. It should have included the \$250k for the Mercury Compliance Study (projects 125607 & 125609) actuals that were moved to the Environmental Air Studies (131693 & 131694) in Sept 2010.

AIP is requesting \$2M for Environmental Air Studies for Mill Creek on LGE (36%), Ghent and Brown (64%) on KU. To be going to IC on 8-26-10. Approved by IC on 9-3-10

Costs	Capital Investment	Cost of Removal/Retirement	Capital Cost Subtotal	Initial O&M Cost	Lifetime Maintenance Cost	O&M Cost Subtotal	TOTAL INVESTMENT
	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Company Labor	\$141,217.87	\$0.00	\$141,217.87	\$0.00	\$0.00	\$0.00	\$141,217.87
Contract Labor	\$3,059,827.28	\$0.00	\$3,059,827.28	\$0.00	\$0.00	\$0.00	\$3,059,827.28
Materials	\$46,185.50	\$0.00	\$46,185.50	\$0.00	\$0.00	\$0.00	\$46,185.50
Other	\$2,757.87	\$0.00	\$2,757.87	\$0.00	\$0.00	\$0.00	\$2,757.87
Local Engineering	\$11.48	\$0.00	\$11.48	\$0.00	\$0.00	\$0.00	\$11.48
Subtotal - GAAP	\$3,250,000.00	\$0.00	\$3,250,000.00	\$0.00	\$0.00	\$0.00	\$3,250,000.00
Net Expenditures - GAAP	\$3,250,000.00	\$0.00	\$3,250,000.00	\$0.00	\$0.00	\$0.00	\$3,250,000.00
2010 Total	\$797,851.62	\$0.00	\$797,851.62	\$0.00	\$0.00	\$0.00	\$797,851.62
2011 Total	\$2,452,148.38	\$0.00	\$2,452,148.38	\$0.00	\$0.00	\$0.00	\$2,452,148.38
2012 Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2013 Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2014 Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Approval Type: Non-IT Projects

Authorized by	Amount	Name	Date Approved	Req'd
Supervisor	\$25,000.00			N
Manager	\$100,000.00	Saunders, Eileen	5/31/2011	Y
Budget Coordinator	\$0.00	Ritchey, Stacy	5/31/2011	Y
Budget Coordinator	\$0.00	Mooney, Michael Allen	5/31/2011	Y
Director	\$300,000.00	Imber, Phillip for Straight, Ronald	5/31/2011	Y
Vice President	\$750,000.00	Voyles, John	6/1/2011	Y
Investment Committee Coordinator	\$0.00	Chapman, Laura	6/1/2011	Y
Financial Planning Director	\$0.00	Garrett, Christopher	6/2/2011	Y
Senior Officer	\$1,000,000.00	Thompson, Paul		Y
CFO	\$1,000,001.00	Rives, Stephen		Y
CEO	\$1,000,002.00	Staffieri, Victor		Y
Property Accounting	\$0.00	Rose, Bruce		Y

INVESTMENT MATERIALS

UOP #	Utility Account Id		Quantity	Total Cost	
06661	131100	MISC PERMANENT STRUCTURES (06	0	\$501,309.61	
06677	131100	MISCELLANEOUS STRUCTURES (066	0	\$810,000.00	

RETIRED EQUIPMENT (OR MATERIALS)

UOP #	Utility Account Id		Quantity	Vintage Year	Original Project Number

AIP QUESTIONS

Are there Related Project Numbers?

Provide related project numbers or indicate 'N/A'.

131694

Is this an IT related project?

IT project is any project that requires IT involvement or the purchase of hardware and software.

no

Purchase/Sale of Real Estate?

Is this a transaction related to the sale/purchase of land or buildings?

no

AIP QUESTIONS**Budgeted?**

Is the project budgeted or unbudgeted?

yes**Alternate Budget Numbers?**

If the project is unbudgeted, list alternate budget reference numbers. Enter N/A, if none.

Approved by Investment Committee on 5-27-11 for additional \$1.0M**Legal Asset Retirement Obligation?**

Is there a legal or environmental requirement governing disposal of this asset?

no**Leased Asset?**

Does this project involve a leased asset?

no**Obsolete Inventory?**

Will this project create obsolete inventory?

no**Environmental Project**

Is this an Environmental Project?

yes**Environmental Cost Recovery**

If an environmental project, is this an approved environmental cost recovery (ECR) project?

no**ECR Project Type**

If this is an ECR project, indicate the project type.

Air**ECR Compliance Number**

If this is an ECR project, provide the ECR compliance plan number (see the approved project list on the Rates and Regulatory intranet site).

Not Assigned Yet**Environmental Affairs**

Does Environmental Affairs need to review this project for environmental permitting issues (based on responses to the six questions in the Investment Proposal)?

no**Research and Experimental Credit**

Is this an experimental project with the purpose of improving, enhancing, or adding to a current manufacturing process?

no**Sales Tax-Pollution Control**

Is this project done for environmental regulations or statutes? (If yes, may qualify for the Pollution Control Exemption.)

no**Sales Tax-Manufacturing Integration**

Is this project integrated in the Manufacturing Process? (Yes to this question and the following two questions may qualify for the New and Expanded Exemption.)

no**Sales Tax-State Equipment Use**

Is this equipment used in the state for the first time?

no**Sales Tax-Upgrade or Improvement?**

Is this project considered an upgrade or improvement? If yes, enter description on next line.

no**Sales Tax-Upgrade Description**

Description of upgrade, if applicable (i.e., improved materials, increased capacity, longer life, etc.) from prior question. Enter N/A, if not applicable.

N/A

Investment Proposal for IC:	Electronic	
Project Name:	MTP and 2011 ECR Engineering- Air Compliance Projects	
Total Expenditures:	\$3,250k (including an incremental \$1,000k)	
Sole Source Authorization	\$2,013k (including an incremental \$413k)	
Project Number:	131693 LG&E	131694 - KU
Business Unit/Line of Business:	Project Engineering	
Prepared/Presented By:	Eileen Saunders/Scott Straight	

Executive Summary

This request seeks additional authorization of \$1,000K to the existing Black & Veatch (“B&V”) engineering contract to begin the project specification development and procurement efforts of major equipment necessary to support the Environmental Air Compliance implementation activities.

On September 2, 2010, \$2,000K was authorized by the Investment Committee to continue to refine the scopes, implementation schedules and cost estimates originally identified in the development of the 2011 MTP. The B&V engineering firm was retained and completed their Phase I effort. This request also includes a sole source award recommendation to award B&V a change order of \$413k to assist Project Engineering and the stations in the development of specifications for the 12 Pulse Jet Fabric Filters (baghouses) for E.W. Brown, Mill Creek, Ghent and Trimble County 1, as well as the development and bid supporting for the Wet FGD specifications for Mill Creek and fan specifications for all units listed in the 2011 ECR filing.

The remainder of the sanction will cover costs of internal labor, as well as the use of other engineering or construction firms as necessary to support the specification development effort.

The Environmental Air Studies Investment Proposal was originally for \$2,000k and was approved by the Investment Committee in September of 2010, but did not include the separately approved Mercury Study dollars. The Mercury Compliance Study was approved for \$250k in May, 2009. These studies were conducted in 2009 and 2010. In September 2010, it was decided to combine the \$250k Mercury Compliance Studies (Project numbers 125607 & 125609) with the newly approved Environmental Air Studies (Project numbers 131693 & 131694) for a total of \$2.25 million. This was due to the fact that the Hazardous Air Pollutants (HAPS) Maximum Achievable Control Technology (MACT) proposed rules included mercury as one of the pollutants. All charges to the Mercury Compliance projects were moved to the Environmental Air Studies in September 2010.

Background

The background for this work is detailed in the original IC paper from August 31, 2010. Essentially, this authorization will give Project Engineering the ability to begin putting the procurement strategies in place that will enable us to react in a more timely fashion upon receipt of the ECR approvals and receipt of the EPA final ruling in November, 2011.

Project Description

The purpose of this scope of work is for B&V to support LG&E and KU with its Global Purchase Program of Air Quality Control Equipment at the Mill Creek, Ghent, Brown, and Trimble County facilities. B&V will assist LG&E and KU with the following 3 Tasks:

Task 1 – Wet FGD Specification Development and Support through Award

Task 2 – Pulse Jet Fabric Filter (PJFF) Specification Development and Support through Award

Task 3 – Fan Specification Development and Support through Award

Project Timeline

Project	Begin	Complete
Phase I Engineering	April, 2010	May, 2010
Phase II Engineering	August, 2010	July, 2011
Specification Development	May, 2011	August, 2011

Procurement activities will take place through the end of 2011.

Economic Analysis and Risks

No economic or risk analyses have been performed as this request seeks only to sanction continuing efforts to refine scopes in support of specification development.

Assumptions

Assumptions that will be used as a basis for the continuance of analyses performed within this sanction are the Energy Services 2011 MTP Assumptions. The primary assumptions are described in the background from the original authorization which is attached to this document.

Financial Summary (\$000s)

Contract Expenditures (\$000s)

Project Expenditures (SMillions)	2010	2011	Total
2011 MTP/LTP	\$1.25	\$0.75	\$2.00
Transfer Mercury Comp. Study	\$0.25	\$0.00	\$0.25
Current Proposal	\$0.80	\$2.45	\$3.25
Variance to 2011 MTP	\$0.70	(\$1.70)	(\$1.00)

The project variance for 2011 will be covered within the overall environmental air budget from the 2011 MTP through the eventual reallocation of this study being applied across the individual air compliance projects.

Sensitivities

No sensitivities were performed.

Environmental

No permits are required for this engineering work.

Risks

The implementation schedule associated with the new regulatory requirements is extremely challenging. Getting to the market place as soon as possible will decrease risk of equipment/material shortages in the market associated with most other coal-fired generators likely requiring the same technologies and equipment.

Other Alternatives Considered

None.

Conclusions and Recommendation

It is the recommendation of Project Engineering that the Investment Committee approve the sanction increase to the MTP Engineering- Air Compliance project from \$2,250k (including \$250k transferred from the mercury studies) to a total revised sanction of \$3,250K. In addition, authority is requested to raise the SSA amount to B&V from \$1,600k to \$2,013k. This will allow the continuance of the studying and analyzing of the scopes and options necessary to develop the specifications and procurement plan for the purchase of Pulse Jet Fabric Filters for twelve units, Wet FGDs for Mill Creek Units 1&2 and Fans for all units that require an upgrade.

Eileen Saunders
Manager – Major Capital Projects
Project Engineering

R. Scott Straight
Director
Project Engineering

John N. Voyles
VP Transmission/Gen. Services

D. Ralph Bowling
VP Power Production

S. Bradford Rives
Chief Financial Officer

Paul W. Thompson
SVP Energy Services

Victor A. Staffieri
Chief Executive Officer

From: Kuhl, Megan
Sent: Wednesday, June 01, 2011 4:43 PM
To: Chapman, Laura
Subject: FW: E-MAIL VOTE SOLICITED: Additional Engineering - Air Compliance Projects

From: Kuhl, Megan
Sent: Friday, May 27, 2011 11:57 AM
To: Hudson, Rusty
Subject: FW: E-MAIL VOTE SOLICITED: Additional Engineering - Air Compliance Projects

The Additional Engineering - Air Compliance Projects has been approved by the Investment Committee.

From: Kuhl, Megan
Sent: Friday, May 20, 2011 4:12 PM
To: Rives, Brad; Thompson, Paul; McCall, John; Hermann, Chris; Blake, Kent; Sinclair, David
Cc: Garrett, Chris; Neal, Susan; Kaiser, Pat; Novak, Lana; Hudson, Rusty
Subject: E-MAIL VOTE SOLICITED: Additional Engineering - Air Compliance Projects

This request seeks additional authorization of \$1,000K to help further refine the scopes, implementation schedules, and cost estimates for the environmental air program. This will increase the project from \$2,250k to a total revised sanction of \$3,250K.

Authority is also requested to raise the SSA amount to Black and Veatch (B&V) from \$1,600k to \$2,013k as part of the overall \$1,000K request. This will allow the continuance of the studying and analyzing of the scopes and options necessary to develop the specifications and procurement plan for the purchase of Pulse Jet Fabric Filters for twelve units, Wet FGDs for Mill Creek Units 1&2, and Fans for all units that require an upgrade.

The project variance for 2011 will be covered within the overall environmental air budget from the 2011 MTP.

Please send your approval/rejection by COB Wednesday, May 25th.

Thanks,

Megan Kuhl
Financial Analyst II, Financial Planning
LG&E and KU Services Company
(502) 627-3716

From: Saunders, Eileen </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=SAUNDERE>
Sent: 4/30/2010 1:13:52 PM
To: Harper, Travis <Travis.Harper@eon-us.com>; Hensley, Mike <Mike.Hensley@eon-us.com>; Stevens, Michael <Michael.Stevens@eon-us.com>; Koller, Tiffany <Tiffany.Koller@eon-us.com>; Piening, Carla <Carla.Piening@eon-us.com>; Nix, Stephen <Stephen.Nix@eon-us.com>; Pabian, Brad <Brad.Pabian@eon-us.com>; Carman, Barry <Barry.Carman@eon-us.com>; Black, Greg <Black@eon-us.com>; Revlett, Gary <Gary.Revlett@eon-us.com>; Wilson, Stuart <Stuart.Wilson@eon-us.com>; Karavayev, Louanne <Louanne.Karavayev@eon-us.com>; Imber, Philip <Philip.Imber@eon-us.com>; Hance, Chuck <Chuck.Hance@eon-us.com>; Whitworth, Wayne <Wayne.Whitworth@eon-us.com>; Fraley, Jeffrey <Jeffrey.Fraley@eon-us.com>; Crutcher, Tom <Tom.Crutcher@eon-us.com>; Billiter, Delbert <Delbert.Billiter@eon-us.com>; Cosby, David <David.Cosby@eon-us.com>; Straight, Scott <Scott.Straight@eon-us.com>; Troost, Tom <Tom.Troost@eon-us.com>; Wilson, Dan <Dan.Wilson@eon-us.com>; Vaughn, Deborah (BOC) <Deborah.Vaughn@eon-us.com>; Jackson, Audrey <Audrey.Jackson@eon-us.com>; Saunders, Eileen <Eileen.Saunders@eon-us.com>
Subject: Copy: Environmental Compliance Project Kickoff Meeting
Location: BOC- Lower Level Assembly Room
Start: Mon 5/10/2010 12:00:00 PM
End: Mon 5/10/2010 5:00:00 PM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Harper, Travis; Hensley, Mike; Stevens, Michael; Koller, Tiffany; Piening, Carla; Nix, Stephen; Pabian, Brad; Carman, Barry; Black, Greg; Revlett, Gary; Wilson, Stuart; Karavayev, Louanne; Imber, Philip; Hance, Chuck; Whitworth, Wayne; Fraley, Jeffrey; Crutcher, Tom; Billiter, Delbert; Cosby, David; Straight, Scott; Troost, Tom; Wilson, Dan; Vaughn, Deborah (BOC); Jackson, Audrey; Saunders, Eileen

When: Monday, May 10, 2010 12:00 PM-5:00 PM (GMT-05:00) Eastern Time (US & Canada).

Where: BOC- Lower Level Assembly Room

Note: The GMT offset above does not reflect daylight saving time adjustments.

~~*~*~*~*~*~*~*~*

All,

Please note the change in the kickoff date. The contractor (Black and Veatch) and I discussed the schedule and agreed that the best use of our time would be to collect data the week of May 3, 2010 and follow up with a more focused kickoff on May, 10th. The next few days, May 11-14 will be used for parallel site visits to all of the plants for additional data collection.

This changes means that you have until May 7, 2010 for us to collect and send in the initial data that was requested in my previous emails. I will send out our data collection strategy next week.

An agenda will be developed and sent out next week. It is possible that some participants may only be needed for part of the meeting. Lunch will be provided from 12:15 until 1pm. The meeting will begin promptly at 1pm.

Thank you for your patience as we work to get this project moving.

Sincerely,

Eileen

From: Sturgeon, Allyson </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=N093308>
Sent: 4/19/2011 2:54:44 PM
To: Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Schram, Chuck <Chuck.Schram@lge-ku.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; 'Kendrick Riggs' <kendrick.riggs@skofirm.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Charnas, Shannon <Shannon.Charnas@lge-ku.com>; Revlett, Gary <Gary.Revlett@lge-ku.com>; Voyles, John <John.Voyles@lge-ku.com>; Straight, Scott <Scott.Straight@lge-ku.com>; Saunders, Eileen <Eileen.Saunders@lge-ku.com>; Wilson, Stuart <Stuart.Wilson@lge-ku.com>; Winkler, Michael <Michael.Winkler@lge-ku.com>; Ehrler, Bob <Bob.Ehrler@lge-ku.com>; Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>
Subject: Copy: General Comments/Discussion on First Draft of ECR Applications and Testimony
Location: LGEC12 North 2 (Cap 15)
Start: Tue 4/26/2011 9:00:00 AM
End: Tue 4/26/2011 10:00:00 AM
Show Time As: Tentative
Recurrence: (none)
Meeting Status: Not yet responded
Required Attendees: Schroeder, Andrea; Schram, Chuck; Conroy, Robert; 'Kendrick Riggs'; Bellar, Lonnie; Charnas, Shannon; Revlett, Gary; Voyles, John; Straight, Scott; Saunders, Eileen; Wilson, Stuart; Winkler, Michael; Ehrler, Bob; Sturgeon, Allyson

When: Tuesday, April 26, 2011 9:00 AM-10:00 AM (GMT-05:00) Eastern Time (US & Canada).
Where: LGEC12 North 2 (Cap 15)

Note: The GMT offset above does not reflect daylight saving time adjustments.

~~*~*~*~*~*~*~*~*

I realize that not everyone is available, but if you can make it, please try to do so. Thanks.

From: Wilson, Stuart
To: Sturgeon, Allyson
Sent: 4/19/2011 3:55:18 PM
Subject: Tentative: General Comments/Discussion on First Draft of ECR Applications and Testimony

From: Wilson, Stuart
To: Sturgeon, Allyson
Sent: 4/20/2011 9:00:48 AM
Subject: Accepted: ECR Testimony Review-Chuck Schram-Stuart Wilson

From: Wilson, Stuart
To: Sebourn, Michael
Sent: 4/21/2011 9:59:49 AM
Subject: FW: Brown Landfill Paper
Attachments: BR Landfill Justification (08-Sep-10).pdf; BR Landfill Justification (08-Sep-10).pptx

John Williams is now heading up the Brown landfill project.

Stuart

From: Williams, John
Sent: Monday, March 21, 2011 2:22 PM
To: Wilson, Stuart
Cc: Heun, Jeff; Schram, Chuck; Straight, Scott
Subject: RE: Brown Landfill Paper

Stuart,

See Attached:

<<...>> <<...>>

Regards,

John

From: Wilson, Stuart
Sent: Monday, March 21, 2011 1:35 PM
To: Heun, Jeff
Cc: Williams, John
Subject: RE: Brown Landfill Paper

Great. Thanks.

From: Heun, Jeff
Sent: Monday, March 21, 2011 1:34 PM
To: Wilson, Stuart
Cc: Williams, John
Subject: RE: Brown Landfill Paper

Stuart,

As an FYI John Williams has taken over as Project Manager of the BR Landfill Project. I have forwarded your request on to him as I am not sure if he has made any changes to the paper.

JBH

From: Wilson, Stuart
Sent: Monday, March 21, 2011 1:26 PM
To: Heun, Jeff
Cc: Schram, Chuck; Straight, Scott
Subject: Brown Landfill Paper

Jeff,

To be sure we have the latest version, could you please forward me the most recent copy of the paper/analysis to justify the Brown landfill project.

Thanks.

Stuart

E.W. Brown CCR Storage Evaluation Continue Main Pond Project vs. Conversion to Landfill September 08, 2010

Executive Summary

On June 21, 2010 the EPA issued a proposed Coal Combustion Residual (CCR) ruling that establishes federal guidelines for CCR storage. In light of the EPA's proposed CCR ruling, Project Engineering (PE) reviewed the CCR storage project (i.e., Main Ash Pond Project) at E.W. Brown (BR) that is under construction to evaluate what effects the EPA's proposed CCR rules potentially imposed on long-term wet storage of CCR at BR.

Significant work has been completed on the BR CCR Project, including detailed engineering and permitting for all phases of the project, as well as the physical work of relocating the transmission lines that cross the ash pond, ash handling upgrades and construction of the Auxiliary (Aux) Pond to elevation 880'. In addition to the completed tasks, construction of the Main Pond Starter Dike (elevation 902') is in progress but has been suspended by PE pending direction on the path forward for long-term CCR storage at BR.

As of June 2010, Phase I spend is \$53.3M of the approved \$73.1M sanction. Construction of Aux Pond elevation 900' (Phase II of II) is currently in progress and will proceed per the original plan or on an accelerated schedule to support CCR storage requirements based on the path forward.

Project Engineering and the BR Station recommend the implementation of Case A to convert the Main Pond into a Landfill to meet the EPA's proposed CCP Ruling. This option has the lowest NPV and NPVRR of the Cases reviewed while maximizing the landfill footprint. Maximizing the landfill footprint also maximizes future vertical expansion opportunities and eliminates future cost and issues associated with Station operations while dewatering and closing the pond post-EPA CCR Ruling. It is important to note that both options proposed by the EPA for CCR storage are for long-term dry storage (i.e., landfill). Therefore, not converting the Main Pond Project to a dry landfill project now will not eliminate the requirement to convert all CCR storage to a dry landfill should either of the EPA proposed regulations become final.

Project Background

In 2005, PE was tasked with evaluating storage options to meet the future CCR storage requirements at BR to 2030. The evaluation process consisted of an Initial Siting study, Conceptual Design phase, and Detailed Design of the Main Pond and Aux Pond. The Initial Siting study evaluated potential storage options for BR Station and recommended an on-site storage facility as the least cost option.

The Conceptual Design was built upon the Initial Siting Study and focused on potential storage options available on-site. Options evaluated included ponds, landfills, and a combination of

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ponds and landfills; with the final evaluation considering three ponds and two landfill options. Pond Option #1 was a vertical upstream expansion of the existing Main Ash Pond, Pond Option #2 was a vertical upstream expansion of the existing Main Ash Pond and a new Gypsum Stack, and Pond Option #3 was a vertical upstream expansion of the existing Ash Pond and a new Bottom Ash Pond. The two landfill options were based on a common footprint; however Landfill Option #1 was based on conventional dry CCR handling and mechanical placement while Landfill Option #2 was based on wet CCR handling and dense slurry placement. Based on Net Present Value (NPV) evaluations of the (5) five options in 2005, the least-cost alternative was Pond Option #3 consisting of a new Aux Pond for bottom ash storage and the vertical upstream expansion of the existing Ash Pond for flyash and non-marketed gypsum storage. Option #3 capital costs (Phase I and II of five Phases) of \$98M were approved for Environment Cost Recovery by the Kentucky Public Service Commission (KYPS) in 2005 and again in 2009.

Upon completion of the Conceptual Design, Detailed Design of the new Aux Pond and vertical upstream expansion of the Main Pond was initiated. Detailed Design included engineering for the ponds, transmission line relocations, station mechanical upgrades, development & submittal of the Dam Safety and 404/401 permits, and several environmental studies to support the permitting process. Detailed Design for the Aux Pond was completed in 2006 followed by the Main Pond in 2007. The original design basis in 2006 was to provide 20-years (until year 2030) of CCR storage based on the following production rates:

CCR	Annual Production (yd³)	20-Year Production (yd³)
Gypsum	500,000	10,000,000
Fly Ash	221,000	4,420,000
Bottom Ash	55,000	1,100,000
Totals	776,000	15,520,000

Current Project Status

Phase I of Pond Option #3 CCR expansion began in 2006 with Detailed Design. The design consists of an expanded Main Ash Pond embankment, construction of an Aux Ash Pond, transmission line relocations, and ash handling upgrades. The Aux Pond is currently in operation at its initial height of elevation 880'. It provides an alternate location to treat bottom ash and fly ash in the area south of the existing Main Pond while the Main Pond Starter Dike (Starter Dike) is under construction. If the Pond Option #3 design progresses to final completion, the Main Pond will have been constructed to elevation 962' and the Aux Pond to elevation 900'.

Aux Pond

The construction sequence of the Aux Pond was designed with a two phase approach, separated by the construction duration of the Main Pond Starter Dike. Construction of the first phase, designated at Aux Pond elevation 880', commenced in October of 2006 and was

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placed into operation in June 2008. The second phase of construction, designated Aux Pond elevation 900', will expand the pond to the final design elevation. The second phase commenced in June 2010 and is currently planned to reach completion in mid-2013.

During the construction of Aux Pond elevation 880', the FGD facility was under construction and gypsum was not in production; therefore, the first phase of the Aux Pond was constructed of clay and rock sourced from on-site borrow. The 47-acre site was stripped and grubbed, karst features were investigated and treated, and a riser outfall structure was constructed to provide outlet control, and the facility's liner system was installed incorporating 60-mil reinforced polypropylene flexible membrane liner (FML). The FGD facility was placed into operation in June 2010, thereby adding gypsum to the by-product stream. The Aux Pond elevation 900' phase incorporates gypsum as the primary constructible fill material.

Main Pond

In June 2008, the Aux Pond was placed into operation at elevation 880'. Shortly thereafter, the Main Ash Pond was taken out of service. To date, excavation and pumping operations of the Main Pond have been performed to drain the low-lying areas allowing the existing ash surface to be stabilized and re-graded. A bi-axial geo-grid reinforced working platform and a starter dike were constructed utilizing shot rock that comprises the foundation for future phased elevation expansions. Also completed is the new riser structure, a storm water runoff system, clay borrow and bottom ash stockpiling, and liner system procurement.

In light of impending EPA regulations that were published in June of 2010, PE suspended most of the work on the Starter Dike contract in an effort to minimize construction of embankments that may not be required should the recommendation to convert the pond project to a landfill is approved. Only shared construction activities between the Starter Dike design and the projected design of a future landfill within the same footprint continue. In suspending the Starter Dike project, the liner system and embankment material can be utilized in the design of the landfill and also utilized to accelerate the construction of the Aux Pond elevation 900' Phase II, thus minimizing approximately \$6.5 million of spend on construction that would be stranded.

Transmission Relocation

Early site construction included the relocation of approximately 13,000 linear feet of overhead electric transmission lines and associated poles and towers to accommodate the expansion of the Main Ash Pond and the construction of the Auxiliary Ash Pond. This phase of the construction effort was initiated in mid-2006 and was completed in 2007.

Ash Handling Upgrades

Multiple plant upgrades to the wet ash handling system resulted from the Main Pond expansion and Aux Pond construction. New higher capacity fly ash and bottom ash sluice

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pumps, servicing all three units, were required to overcome the added height of the Main Ash Pond embankment and the distance to the Aux Pond.

Phase I Financials

The following table depicts the Phase I expenditures to date verses the Phase I sanction amount.

Cost Through June '10 (\$000)	
Engineering	\$4,728
Transmission Line Relocation	\$18,017
Ash Handling Upgrades	\$5,947
Aux Pond 900'	\$8,442
Main Pond Starter Dike	\$13,202
E.ON U.S./Other	\$2,947
Sub-Total	\$53,283
ECR/Sanction Approved	\$73,100
Remaining Budget	\$19,817

EPA's Proposed CCR Ruling

As a result of the December 2008 ash pond failure at TVA's Kingston's Generating Station, the EPA issued a proposed CCR ruling on June 21, 2010 that would establish federal guidelines for CCR storage. The proposal had three options to govern the storage of CCR, Subtitle "C" – Hazardous, Subtitle "D" – Non-Hazardous, and Subtitle "D" Prime – Non-Hazardous.

Subtitle "C" – Hazardous

The Aux Pond and Main Pond at BR would not comply with the proposed ruling due to strict siting requirements and not having a composite liner. As a result the ponds would have to be closed per one of the two options below:

1. Prior to the ruling becoming effective, BR could cease operation of the ponds and close them under current KY Division of Waste Management regulations. Existing ponds would not be grandfathered in.
2. Once the ruling becomes effective, the ponds would have to stop receiving CCR within 5-years and close within 2-years thereafter. New Subtitle "C" permits would be required in addition to run-on & run-off controls, groundwater monitoring, corrective action plans, closure/post-closure care plan, and financial assurance per the ruling.

PROJECT ENGINEERING***Subtitle “D” – Non-Hazardous***

The Aux Pond could potentially comply with Subtitle “D” requirements but is highly unlikely as the liner consists of 18” of clay overtopped by an FML while the regulations calls for 24” of clay overtopped by an FML. Without changing our current design plans, the Main Pond at BR would not comply with the proposed ruling due to not having a composite liner and meeting strict siting requirements. As a result, the ponds would have to be closed per one of the two options below:

1. Prior to the ruling becoming effective, BR could cease operation of the ponds and close them under current KY Division of Waste Management regulations. Existing ponds would not be grandfathered in.
2. Once the ruling becomes effective, the ponds would have to stop receiving CCR within 5-years and close within 2-years thereafter. New Subtitle “D” permits would be required in addition to run-on & run-off controls, groundwater monitoring, corrective action plans, and closure/post-closure care plan per the ruling.

Subtitle “D” Prime – Non-Hazardous

Under Subtitle “D” Prime the current elevation of the Aux Pond and Main Pond at the effective date of the ruling would be grandfathered in and allowed to operate for their remaining useful life. However, any future vertical or horizontal expansion would fall under the new regulations and require a new permit, strict siting requirements, composite liner, run-on & run-off controls, groundwater monitoring, corrective action plan, and closure/post-closure care plan per the ruling. These requirements would preclude moving forward because the Main Pond (1) will not provide the required storage volume for CCR due to not being constructed to its final design elevation prior to the rules becoming effective because of both lack of gypsum or rock to construct the berm and insufficient time; and (2) the Main Pond, once placed into operation and filled with water, cannot be retrofitted with the required composite liner to comply with the strict siting requirements.

Under Subtitle “C” the EPA would effectively force the closure of all existing impoundments and eliminate impoundments for future CCR storage as a result of siting restriction, tighter water treatment standards, and cost to implement all technical requirements as set forth. Under Subtitle “D” existing impoundments that do not meet the proposed requirements would be forced to close. However, under Subtitle “D” new impoundments that are designed and constructed with a composite liner, groundwater monitoring, and in compliance with all performance standards would be allowed.

The EPA’s proposed ruling will be considered in determining the path forward for the BR CCR project and its effects on the project will be discussed in later sections.

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Design Basis Moving Forward

As a result of the EPA's proposed CCR Ruling, PE has reevaluated long-term CCR storage at BR as the current Main Pond design will no longer meet the 2030 storage requirement. The analyses are based on an assumption that the proposed ruling becomes effective on January 2012. The January 2012 effective date was based on the proposed ruling being approved in 2010, and accounted for one year of litigation before the ruling became effective. The 3 options available are summarized below:

- **Base Case** – Continue with construction of the Aux Pond to elevation 900' and the Main Pond to 962' per the original design.
- **Case A** – Stop construction of the Main Pond Starter Dike immediately and convert the Main Pond into a landfill prior to the effective date of the CCR Ruling and prior to placing wet CCR in the Main Pond. Complete construction of the Aux Pond 900' project utilizing rock in lieu of gypsum to accelerate construction completion prior to the rules becoming effective. The Aux Pond will eventually be closed per the new regulations once the landfill is placed into service.
- **Case B** – Continue construction of the Main Pond Starter Dike and Aux Pond 900' per the original design. Once the CCR Ruling becomes effective, take the Main Pond out of service, close and cap it per the new regulations, and then construct a landfill similar to Case A on top of the newly constructed Main Pond Starter Dike. As with Case A, once the landfill is placed into service the Aux Pond will be closed per the regulations.
- **Case C** – Modify the design of the Main Pond and install a composite liner per Subtitle "D" requirements. Complete the Aux Pond 900' project as originally designed.

Each case was evaluated based on the most recent forecast of CCR production rates as provided by Generation Planning. In the third quarter of 2009, Generation Planning issued updated CCR production rates based on the projected 2010 MTP generation plan. The CCR production rates for BR modeled in 2009 were significantly lower than the original production rates utilized in 2005. This is attributed to a significant reduction in the station's capacity factor from 77 percent to 54 percent due to shifting generation to other stations. Comparison of the average annual CCR production rates are provided below:

CCP	Average Annual Production Rates (yd ³)			
	2005 Design Basis	2010 MTP	Δ	% Reduction
Bottom Ash	55,000	35,879	(19,121)	35%
Fly Ash	221,000	143,516	(77,484)	35%
Gypsum	500,000	290,000	(210,000)	42%
Totals	776,000	469,395	(306,605)	47%

The required CCR storage capacity till 2030 using the 2010 MTP production rates is now 7M yd³ based on an in-service date of January 2014. If utilizing the original 2005 design volume of

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15.5M yd³ the storage, the facility would have a design life of approximately 38-years (2048), well beyond BR's needs.

Moving forward, the CCR storage facility at BR for both viable Cases A and B will provide a minimum storage capacity of 7M yd³ and will allow for future expansion if necessary. As described below, the Base Case of continuing to construct the Main Pond and utilize it until 2030 will not be allowed under either scenario in the proposed regulations. In other words, the CCR landfill for both Cases will be designed and permitted with the maximum footprint available and the height of the facility will be adjusted to meet potential changing capacity requirements.

Base Case

The Base Case is the plan currently being implemented and is in-line with the approved ECR & 2006-2010 MTP/LTP plans. Phase I included the design & permitting of the Aux Pond and Main Pond, relocation of the transmission lines, wet ash handling upgrades, Aux Pond 880' construction, and Main Pond Starter Dike construction. All items except the Main Pond Starter Dike construction (in suspension) have been completed. Phase II includes Aux Pond 900' (its final elevation) and Main Pond 912' construction utilizing gypsum. Under the EPA's proposed CCR Ruling, neither pond will meet either of the proposed requirements and will be required to close per the timeframe outlined in the ruling. As a result, moving forward with the Base Case based on the current plan and liner design will not provide BR the required storage through 2030, even at the lower 2009 model production rates.

Base Case Design Issues

The EPA has proposed three options to manage CCR. If the EPA moves forward with Subtitle "C", this option will effectively eliminate all wet CCR storage and would require all existing ponds to retroactively meet the design criteria or cease operation and close per the requirements set forth under Subtitle "C". The Main Pond at BR would not comply with the proposed ruling due to siting requirements, land disposal restrictions (waste treatment), and not having a composite liner & leachate collection system along with other minor issues. A composite liner and leachate collection system could be installed; however the siting requirements and land disposal restriction would remain an issue.

Under Subtitle "D", the EPA is more open to wet storage of CCR. However, several issues remain such as siting requirements (karst, seismic, proximity to wetland & adjacent property owners, etc), composite liner & leachate collection system, and requiring ponds to retroactively meet the design criteria or cease operation and close per the requirements set forth under Subtitle "D". Prior to the effective date of the EPA's ruling, the Main Pond could be constructed to its ultimate elevation of 928' using rock (if a source of sufficient rock quantity can be found) in-lieu of gypsum and include a composite liner with leachate collection. However, the Main Pond would still be subject to the siting requirements under Subtitle "D". By using rock in-lieu of gypsum, the design life of the pond will be reduced by 8 years as the gypsum eventually produced that would have been used to construct the dike would instead be stored in the pond. To complete construction prior to the effective date, embankment must be placed at 12,000 yd³ per day when normal average construction is

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3,000-5,000 yd³ per day. In addition, close proximity land would have to be purchased to supply the quantity of clay required to construct the composite liner and to supply the rock necessary to construct the embankments. Compliant rock and clay currently sourced from the Houpp Property is becoming limited. Based on production rates from the existing quarry, an additional 200 acres would be required to supply the 2.2M yd³ of rock needed to complete the Aux Pond to an elevation of 900' and the Main Pond to an elevation of 928'. The purchase of 200 acres for additional borrow sources would add \$2.0M (2010 dollars) to the project based on cost data gathered on the Ghent Landfill Project. Assuming the new quarry is located less than 5 miles from the plant and utilizing 40-ton articulated trucks, the additional hauling cost would be approximately \$10.25M (2010 dollars) based on 2010 RS Means estimating manuals. These additional costs have not been included in the NPV or PVRR analysis.

Construction of the Main Pond could continue by modifying its design to comply with the proposed technical requirements at a significant cost increase and risk to the company. The technical requirements as proposed could change prior to the final ruling and the pond would no longer be in compliance. The EPA is trying to eliminate ponds and move towards dry landfills; therefore, constructing a new pond for long term CCR storage carries significant risk.

Under Subtitle "D" Prime the current elevation of the Main Pond, at the effective date of the ruling, would be grandfathered in and allowed to operate for the remainder of its useful life. However, any future vertical or horizontal expansion would fall under the new regulations and require a new permit, compliance with strict siting requirements, composite liner, run-on & run-off controls, groundwater monitoring, corrective action plan, and closure/post-closure care plan per the ruling. Prior to the effective date of the EPA's ruling the Main Pond could be constructed to its ultimate elevation of 928' as described above. However, there is significant risk as Subtitle "D" Prime is the least likely alternative to be approved as the EPA is trying to eliminate ponds and move towards dry landfills.

Based on the revised 2010 MTP CCR production rates requiring the reduced storage of 7M yd³, the Main Pond's maximum elevation has been lowered from 962' to 928'. Moving forward, cost data provided for the Base Case will be based on a final elevation of 928'. The following table reflects the NPV, PVRR, and capital cost cash flows for the Base Case option as currently included in the 2011 MTP/LTP draft of July, 2010.

Base Case Capital Cost (\$000) for 7M yd ³											
2010	2011	2012	2013	2014	2015	2016	2017	2018	NPV	PVRR	Total Project
\$19,300	\$6,700	\$4,153	\$6,365	\$3,424	\$8,951	\$2,637	\$2,699	\$3,813	\$103,720	\$127,799	\$121,687

Case A

Case A consists of immediately terminating construction of the Main Pond Starter Dike (excluding site close out activities such as dust control and reclamation), accelerating the construction of the Aux Pond utilizing rock already blasted that has been recently placed in the Main Pond Starter Dike (thus reducing stranded investments), continued ash grading, Main Pond

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cap/closure, Landfill engineering and permitting, converting all station ash handling systems from wet to dry, and constructing the initial phase of a Landfill. Based on recent projects, the anticipated duration to perform these activities is 3.5 years with an in-service date of January 2014.

Design and construction of the Landfill would begin prior to final approval of the EPA's proposed CCR Ruling; however the Landfill liner requirements for both Subtitle "D" Non-Hazardous and "C" Hazardous options are the same and will become the basis of design. By terminating construction of the Main Pond Starter Dike, material already purchased and/or stockpiled, such as FML, Filter Fabric, Clay, Rock, and Bottom Ash, will be utilized in the construction of the Landfill thereby minimizing the cost impacts from the approximately \$6.5 million stranded cost for the materials purchased or quarried. Additionally, by utilizing rock already blasted and placed in the Main Pond Starter Dike, the footprint of the landfill will be optimized to approximately 100 acres thereby reducing the final height of the landfill and maximizing the future vertical expansion opportunities up to approximately 18M yd³.

All Plant effluents and CCR will continue to be directed to the Aux Pond during the design, permitting, and construction of the landfill for approximately 3.5 years in order to keep BR in operation. Based on a recent bathymetric survey conducted by MACTEC, and utilizing the 2010 CCR Production Rates, the Aux Pond has enough remaining capacity to store all the CCR generated through January 2015. This is a conservative estimate and provides one year of project float. The following table reflects the NPV, PVRR, and capital cost cash flows for Case A as reflected in the notes to the 2011 MTP/LTP as Landfill Option #1.

Case A Capital Cost (\$000)											
2010	2011	2012	2013	2014	2015	2016	2017	2018	NPV	PVRR	Total Project
\$9,051	\$14,262	\$26,722	\$24,064	\$0	\$0	\$0	\$0	\$9,321	\$126,322	\$181,791	\$154,939

Case B

Case B consists of completing the Main Pond Starter Dike and Aux Pond 900' projects as designed and permitted prior to final approval of the EPA's proposed CCR Ruling. Upon approval of the EPA's proposed CCR Ruling, the Main Pond would be taken out of service; the Main Pond would then be dewatered, followed by ash grading, Main Pond cap/closure, Landfill engineering, permitting, wet to dry ash handling conversion, and the initial phase of construction of the Landfill. Based on recent projects, the anticipated duration to perform these activities is 5.5 years with an in-service date of January 2016.

If the construction of the Main Pond Starter Dike were to continue to completion and the EPA's proposed ruling was approved, material already purchased and/or stockpiled such as FML, Filter Fabric, Clay, Rock, and Bottom Ash *cannot* be salvaged or otherwise made available for the construction of the Landfill resulting in the need to purchase additional land for approximately \$2M to develop new borrow sources and liner material at future market values. Design and construction of a landfill would begin after final approval of the EPA's proposed CCR Ruling which would be the basis of design. By continuing with the construction of the Main Pond Starter Dike, the footprint of the landfill would be approximately 80 acres, some 20 acres less

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than Case A, thus reducing the potential for future vertical expansion, approximate maximum capacity 13.25M yd³. Case B also would involve having to develop an operation plan for the Brown Station that would enable it to remain in operation while the recently constructed Main Pond was taken back out of service and dewatered to allow construction of the Landfill. **These operational costs are not included in the total project cost shown in the table below as they are difficult to estimate at the time of preparing this paper; however, they are expected to be significant.**

During the design and permitting of the landfill, both the Aux Pond and Main Pond will be used to store CCR material. During construction, a duration of approximately 2 years, all CCR generated will be stored in the existing Aux Pond. Based on a recent bathymetric survey conducted by MACTEC, and utilizing the 2010 CCR Production Rates, the Aux Pond has enough remaining capacity to store all the CCR generated for 2 years starting January 2014. The following table reflects the NPV, PVR, and capital cost cash flows for Case A as reflected in the notes to the 2011 MTP/LTP as Landfill Option #2.

Case B Capital Cost (\$000)											
2010	2011	2012	2013	2014	2015	2016	2017	2018	NPV	PVRR	Total Project
\$19,350	\$2,907	\$3,605	\$10,786	\$31,135	\$31,387	\$0	\$0	\$0	\$143,980	\$204,633	\$193,567

NOTE: Case B values do not include the estimated \$2.0M for land purchase for additional clay borrow source.

Case C

Case C consisted of completing the Aux Pond 900' project as designed and modifies the Main Pond Starter Dike to include a composite liner system. With the addition of 24" of clay the Main Pond could comply with Subtitle "D"; however, the Main Pond would not comply with Subtitle "C" and does not comply with the EPA intent to eliminate ponds for storage. Case C was eliminated because (1) it is not possible to source clay and rock from the existing station property in the quantities required; (2) it is not economically feasible to source clay from the surrounding area and the time required to locate and acquire a farm with sufficient quantities within the timeframe required is deemed marginal at best; and (3) to design and construct the composite liner will only allow compliance with subtitle "D" and not "C". Based on this no further consideration was given to Case C.

Schedule Impacts

If the decision is made to convert the Main Pond into a Landfill there are several items that will impact the schedule. They include engineering/design, permitting, a new or updated ECR/CPCN filing, and initial landfill construction. Based on experience from previous projects the engineering/design will take approximately 3-4-months and will include development of the landfill drawings, specifications, stability analysis, groundwater monitoring plan, and permit application.

Permitting will take approximately 18-months and should only include the KY Division of Waste Management permit as the remaining permits were obtained during the original Main

PROJECT ENGINEERING



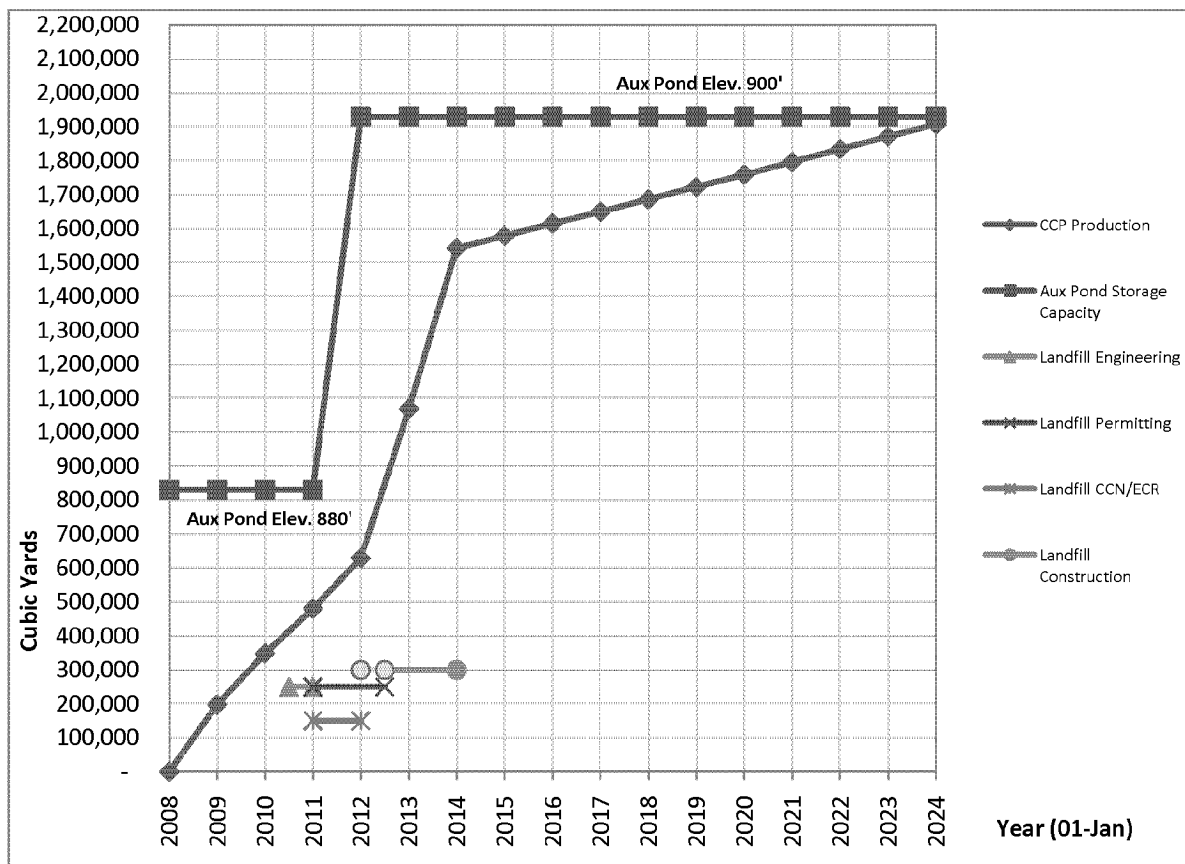
Pond project permitting. The updated or new ECR/CPCN filing will take approximately 6-months and would be submitted in parallel with the engineering/design and permitting process.

The initial landfill construction timeline will be dependent on the chosen option, but will take between 18-24 months to complete. Based on the above, PE performed an analysis to ensure the Aux Pond had enough storage capacity remaining to support the conversion of the Main Pond into a Landfill. Results of the storage analysis are provided below and indicate that the Aux Pond has enough capacity to support either Case A or Case B.

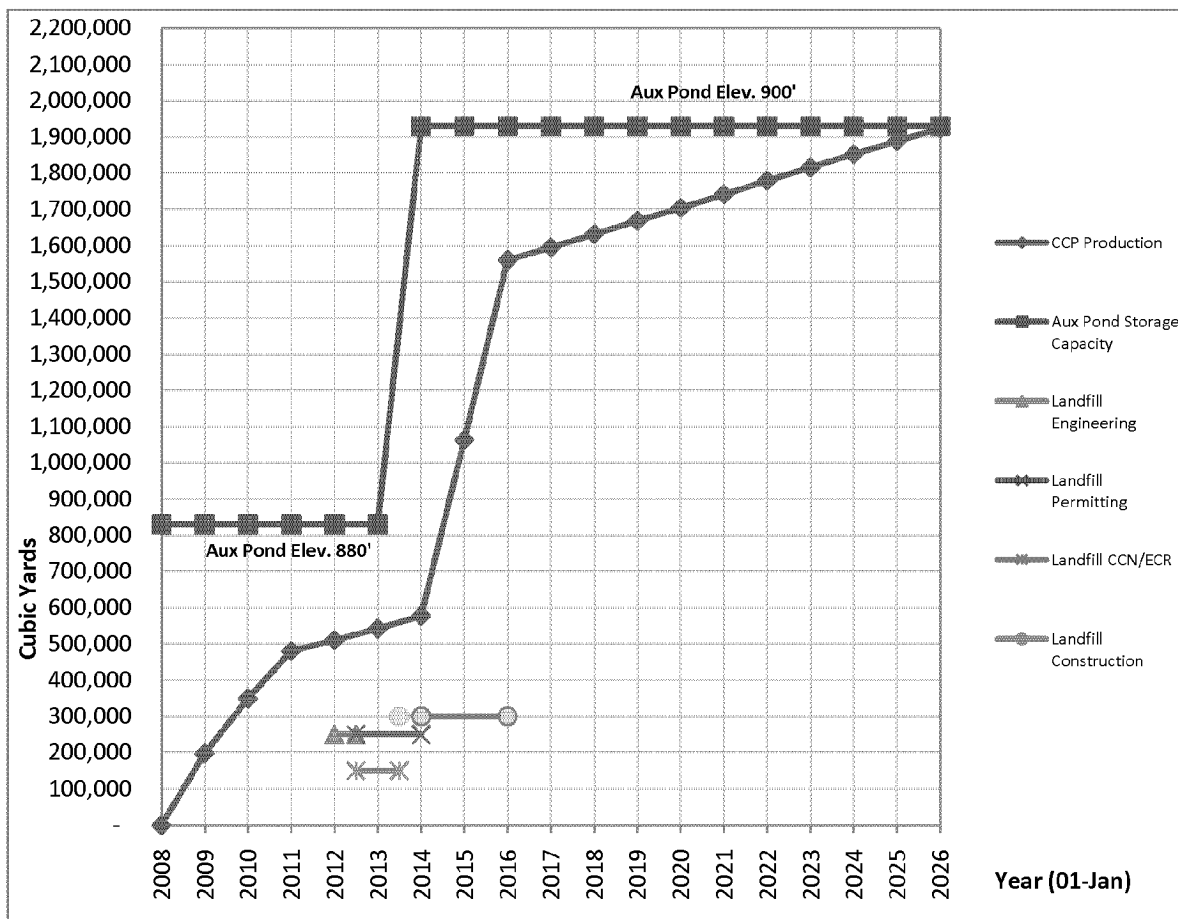
A summary of the schedule is shown below.

Project Timeline		
Task	Date	Duration
Informal Meeting w/the PSC	October 2010	1 Day
Engineering	September 2010	3-4 Months
File Permits	December 2010	18 Months
CPCN/ECR Filing	December 2010	6 Months
Construction	May 2012	18 Months

Aux Pond Stage Storage Graph (Case A) – Stop Main Pond Starter Dike & Accelerate Aux Pond 900’ Construction



Aux Pond Stage Storage Graph (Case B) – Complete Main Pond Starter Dike & Aux Pond 900’ per Original Schedule



Financials

Considering the factors referenced above, PE with the assistance of MACTEC, developed capital cost estimates for Case A and B which were based on a horizontal expansion of the landfill. Additional engineering is required to determine if a horizontal or vertical expansion approach is the best alternative. Timing of cash flows would be affected if a vertical expansion approach is chosen. The ECR approved cost estimate is the basis for the 2011 MTP/LTP and is provided for reference only. The Base Case is a modification of the ECR approved option which provides 7M yd³ of storage and is no longer a viable long term solution for CCR storage as the current design of the Main Pond will not comply with the EPA’s proposed CCR Ruling. *Case A or B are the only long term storage solutions.*

PROJECT ENGINEERING

Cost Estimate Comparison											
Option	Life	Capacity	2010	2011	2012	2013	2014	2015	NPV	PVRR	Total Project
ECR Approved	2054	15.5M yd ³	\$25,233	\$10,220	\$8,777	\$4,865	\$5,463	\$6,945	\$143,394	\$158,684	\$200,132
Base Case	2030	7M yd ³	\$19,300	\$6,700	\$4,153	\$6,365	\$3,424	\$8,951	\$103,720	\$127,799	\$121,687
Case A	2030	7M yd ³	\$9,051	\$14,262	\$26,722	\$24,064	\$0	\$0	\$126,322	\$181,791	\$154,939
Case B	2030	7M yd ³	\$19,350	\$2,907	\$3,605	\$10,786	\$31,135	\$31,387	\$143,980	\$204,633	\$193,567

NOTE: Case B values do not include the estimated \$2.0M for land purchase for additional clay borrow source.

Recommendation

Project Engineering and the Brown Station recommend the immediate implementation of Case A to convert the Main Pond into a Landfill to meet the EPA's proposed CCP Ruling. This option has the lowest NPV & PVRR, is the least cost, maximizes the landfill footprint, maximizes future vertical expansion opportunities to accommodate changes in production, and eliminates the difficult and costly issues associated with maintaining station operations while dewatering and closing the pond post EPA CCR Ruling while the landfill is being constructed.



EW Brown CCR Storage Evaluation

Continue Main Pond Project vs. Landfill Conversion

September 8, 2010



Current Plan (Base Case – Modified ECR Approved Scope)

Scope

- Detailed engineering and permitting for all phases, completed 2006
- Relocation of transmission lines, completed 2007
- Ash handling upgrades, completed
- Construction of Aux Pond to elevation 880' (Phase I), completed June 2008

Schedule

- Aux Pond elevation 900' construction (Phase II of II), in progress
 - Will continue via original plan (completion mid-2013) or accelerated schedule to support CCR storage requirements to support landfill development.
- Construction of Main Pond Starter Dike, elevation 902', 75-80% complete
 - Currently suspended pending direction of path forward (Landfill or Pond)
- Accelerate construction of the Aux and Main Ponds based on working one shift, 7 days a week, at 4,000 yd³ per day using rock and gypsum. Very aggressive schedule
 - Aux Pond constructed to final elevation of 900'
 - Main Pond constructed to an elevation of approximately 912'

Financials

- Phase I: \$53.3M of approved \$73.1M spent through June 2010
- Phase II: \$24.9M approved



Proposed CCR Rulings: Impact to Current Plan

Subtitle "C" (Hazardous)

Aux Pond and Main Pond – as currently designed, they are not compliant due to lack of composite liner and may not meet siting requirements relative to Karst terrain.

Result: Will required the closing of both ponds or retrofit with new liner design as grandfathering is not an option.

Subtitle "D" (Non-Hazardous)

Aux Pond – compliance unlikely due to current 18" clay liner vs. required 24".

Main Pond – as currently designed, not compliant due to lack of composite liner and may not meet siting requirements relative to Karst terrain.

Result: Will require the closing of both ponds or retrofit with new liner system.



Proposed CCR Rulings: Impact to Current Plan

Subtitle "D" Prime (Non-Hazardous)

The Aux and Main Pond elevations at effective date of ruling will be grandfathered in; thus allowing the ponds to be operated for their remaining life.

Any future vertical/horizontal expansion subject to new regulations which will require re-permitting, siting assessment, composite liner, run-on/off controls, groundwater monitoring, corrective action plans, and closure/post-closure care plans.

Result: Effective date likely to result in lack of fully constructed Main Pond, thus new regulations will require closing Main Pond down and constructing new designed pond or landfill.



Base Case – 20 Year Storage Capacity

- Based on the current ECR approved plan adjusted to provide storage until 2030
- Phase I – ECR approved 2005
 - Design & permitting of the Aux and Main Ponds - Completed
 - Transmission Line Relocation - Completed
 - Ash handling upgrades - Completed
 - Aux Pond 880' construction - Completed
 - Main Pond starter dike (902') construction – Construction has been suspended
- Phase II – ECR approved 2009
 - Aux Pond 900' construction – Under Construction
 - Main Pond 912' construction
- Phase III – future ECR filing
 - Original ECR scope reduced to match current CCR production rates
 - Main Pond 928' construction versus original 962'



Landfill – Case A (Convert Now Prior to Placing Main Pond In-service)

Main Pond Starter Dike

Stop construction immediately.

EPA's proposed ruling used as the basis of design.

Convert Main Pond to a Landfill prior to effective date of CCR Ruling and prior to placing wet CCR in Main Pond.

- Landfill liner requirements same among Subtitle "D" and "C"
- Utilize material already purchased and/or stockpiled for the intended Main Pond Starter Dike
- Minimize costs from stranded materials purchased or quarried (~\$6.5M)
- Landfill footprint approximately 100 acres within Main Pond footprint, this reduces final height of landfill while maximizing future vertical expansion opportunities up to 18M yd³.

Aux Pond 900'

Accelerated completion of project utilizing rock and gypsum.

After Landfill is placed into operation, close per regulations and modify with new design for management of process water.

Anticipated duration of activities

3.5 years, in service date of January 2014



Landfill – Case B (Convert Pond to Landfill Post Regulations)

Main Pond Starter Dike

Continue construction per original design.

- Material used for pond liner will not be available for landfill construction.
- Will require new off-site quarry at an estimated cost of \$2.0M (due to consuming existing quarry for Main and Aux Pond construction), as well significant purchase of new liner material.
- Landfill footprint approximately 80 acres, 20 acres smaller than Case A due to Main Pond utilization consuming space; thus reducing future storage to 13.25M yd³ due to reduced vertical expansion.

Once anticipated ruling becomes effective:

Main Pond required to be taken out of service

New Landfill will be required

Operation plan needed to maintain Brown Station's operation while Main Pond is taken out of service, dewatered, and landfill constructed. This is anticipated to be a significant impact on the station, a detailed plan of how to accomplish this has not been developed, nor included in the financial comparison.

Aux Pond 900'

Continue construction per original design

After Landfill is placed into operation, close per regulations and modify with new design for management of process water.



Schedule

Project Timeline

Task	Start Date	Duration
Informal Meeting with PSC	October 2010	1 Day
Engineering	September 2010	3-4 Months
File Permits	December 2010	18 Months
CPCN/ECR Filing	December 2010	6 Months
Construction	May 2012	18 Months



Financial Comparison

Cost Estimate Comparison

Option	Life	Capacity	NPV	PVRR	Total Project
ECR Approved	2054*	15.5M yd ³	\$135,467k	N/A	\$272,831
Base Case	2030	7.0M yd ³	\$100,966k	\$127,799	\$118,718
Case A	2030	7.0M yd ³	\$126,322k	\$181,791	\$154,939
Case B	2030	7.0M yd ³	\$143,980k	\$204,633	\$193,567k

NOTES:

1. If regulations become final for Hazardous or Non-Hazardous, Base Case will not be viable as the new regulations will require the closing of the newly constructed Ponds.
2. For ECR Approved Case, the original life was 2030 based on 2005 production models. The 2009 production models have shifted generation away from Brown, thus life extended to 2054 if Main Pond developed to original design height.
3. The interim operational and capital cost associated with Case B are not included in the number above. Given Case B is not least-cost in comparison to Case A, the estimate was not performed.
4. \$2.0M to purchase additional land to establish clay borrow for Case B only is not included in the above financial analysis.



Recommendation

Immediate implementation of Case A (convert to Landfill prior to Main Pond In-service)

Lower NPV & PVRR than Case B

Lower escalated capital cost than Case B

Maximizes landfill footprint and future storage capacities than Case B

Maximizes future vertical expansion opportunities than Case B

Eliminates difficult and costly issues associated with maintaining station operations while dewatering and closing the Main Pond post-EPA CCR Ruling while landfill is being constructed.

This recommendation will require modifying the approved ECR project.

This recommendation will require Landfill permitting.

This recommendation will require PSC notification.

From: Sturgeon, Allyson </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=N093308>
Sent: 5/5/2011 1:52:37 PM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; 'Riggs, Kendrick R.' <kendrick.riggs@skofirm.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Schram, Chuck <Chuck.Schram@lge-ku.com>; Wilson, Stuart <Stuart.Wilson@lge-ku.com>
Subject: Copy: ECR Testimony Review-Chuck Schram-Stuart Wilson
Location: LGEC12 North 1 (Cap 15)
Start: Mon 5/9/2011 3:00:00 PM
End: Mon 5/9/2011 4:30:00 PM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; 'Riggs, Kendrick R.'; Conroy, Robert; Schroeder, Andrea; Bellar, Lonnie; Schram, Chuck; Wilson, Stuart

From: Wilson, Stuart
To: Sturgeon, Allyson
Sent: 5/5/2011 4:32:58 PM
Subject: Accepted: ECR Testimony Review-Chuck Schram-Stuart Wilson

From: Wilson, Stuart
To: Sturgeon, Allyson
Sent: 5/11/2011 10:40:40 AM
Subject: Accepted: Final ECR Application and Testimony Review

From: Walters, Kim </O=LGE/OU=LOUISVILLE/CN=RECIPIENTS/CN=E010358>
Sent: 5/18/2011 7:58:08 AM
To: Sturgeon, Allyson <Allyson.Sturgeon@lge-ku.com>; Voyles, John <John.Voyles@lge-ku.com>; Schram, Chuck <Chuck.Schram@lge-ku.com>; Charnas, Shannon <Shannon.Charnas@lge-ku.com>; Bellar, Lonnie <Lonnie.Bellar@lge-ku.com>; Conroy, Robert <Robert.Conroy@lge-ku.com>; Revlett, Gary <Gary.Revlett@lge-ku.com>; Straight, Scott <Scott.Straight@lge-ku.com>; Wilson, Stuart <Stuart.Wilson@lge-ku.com>; Saunders, Eileen <Eileen.Saunders@lge-ku.com>; Schroeder, Andrea <Andrea.Schroeder@lge-ku.com>; 'Riggs, Kendrick R.' <kendrick.riggs@skofirm.com>; 'Crosby, W. Duncan' <duncan.crosby@skofirm.com>; LGEC12 West 1202 (Cap 35) <EONUSC12WEST1202@lge-ku.com>
Subject: Copy: Final ECR Application and Testimony Review (Updated with new location)
Location: LGEC 1202
Start: Wed 5/18/2011 1:00:00 PM
End: Wed 5/18/2011 3:00:00 PM
Recurrence: (none)
Meeting Status: Not yet responded

Required Attendees: Sturgeon, Allyson; Voyles, John; Schram, Chuck; Charnas, Shannon; Bellar, Lonnie; Conroy, Robert; Revlett, Gary; Straight, Scott; Wilson, Stuart; Saunders, Eileen; Schroeder, Andrea; 'Riggs, Kendrick R.'; 'Crosby, W. Duncan'; LGEC12 West 1202 (Cap 35)

From: Wilson, Stuart
To: Sturgeon, Allyson
Sent: 5/18/2011 9:43:19 AM
Subject: Accepted: Final ECR Application and Testimony Review (Updated with new location)

From: PAUL.THOMPSON@LGE-KU.COM
To: Rives, Brad
Sent: 3/24/2011 4:30:11 PM
Subject: AIP Project Approval - 131693 - REVISION
Attachments: 2011 MTP Level I Engineering - Air Compliance Projects.docx; 131693-18.pdf; AIP Combining Mercury and Air.docx

LG&E project number 131693 (Envir Compliance Study-Air-LGE) has been submitted for your approval. Please login to PowerPlant and respond to the items awaiting your approval.

[login to powerplant](#)

Investment/Contract Proposal for IC: e-mail vote on 8/27/10

Project Name:	MTP Engineering – Air Compliance Projects	
Total Expenditures:	\$2,000K	
Sole Source Amount:	\$1,600K	
Project Number:	131693 – LG&E	131694 - KU
Business Unit/Line of Business:	LG&E and KU Coal-Fired Generation	
Prepared/Presented By:	Eileen Saunders/Scott Straight	

Executive Summary

This request seeks authorization of \$2,000K to continue refining the scopes, implementation schedules and cost estimates of projects identified in the development of the 2011 MTP as necessary for compliance with proposed or final local, State and Federal air compliance regulations through 2016.

In addition to requesting approval of a new engineering project that will continue refining the 2011 MTP air compliance scope, this request also seeks approval of a sole source award to Black & Veatch (B&V) engineering firm. B&V will perform the majority of studies included in the \$2 million project sanction request; however, smaller valued contracts will be awarded to various technology firms to perform miscellaneous reviews of the LG&E and KU existing air pollution control technologies for potential upgrades to their performance.

Background

Starting this year and continuing for the next two years, the United States Environmental Protection Agency (USEPA) will be developing and implementing several new environmental regulations. These new regulations will significantly impact our coal-fired electric generating units and will affect all environmental areas of air, water and land. The pollutants targeted in three of the new air regulations are SO₂ and NO_x. There is a recent new 1-hour National Ambient Air Quality Standard (NAAQS) for SO₂ and NO_x that will require lower emission rates at several of the stations and the CAIR rule is proposed to be replaced by a new Clean Air Transport Rule (CATR). Each will require additional reductions in SO₂ and NO_x. In 2011, the USEPA is expected to propose and finalize an Electric Utility Maximum Achievable Control Technology Rule (MACT). The MACT rule will require significant reductions in hazardous air pollutants such as mercury and acid gases (i.e., SO₃/H₂SO₄ emissions) which are also emitted from the LG&E and KU coal-fired electric generation fleet.

In May of 2010, Project Engineering was asked to investigate the technological and financial impacts of new environmental air regulations on the KU and LG&E coal-fired units. B&V was hired through a competitive bid process at a contract valued at \$149K and given six weeks to provide a high level estimate based on site visits, data collection from the plants and industry experience. As a result of this Phase I effort, approximately \$3 billion (escalated) of Air

Emissions Mitigation System additions and retrofits were identified as possible scenarios for bringing the fleet into compliance with the projected standards.

Through the approval of this investment/contract proposal, B&V will be contracted with to continue with Phase II of the engineering and estimating effort. This effort will provide a facility-specific project definition consisting of conceptual designs and budgetary cost estimates for selected air quality control technologies. This effort will result in a Level 1 Engineering assessment for Mill Creek, Ghent and EW Brown. The work for each facility will be staggered with the Mill Creek effort commencing first.

Award of the Phase II work to B&V will provide continuity to the initial study work. The contract will be on a time and material basis, not-to-exceed sole source contract, with a value of \$1.6M. Black and Veatch will keep their original team in place to gain efficiencies for the Phase II work. The scope of their work will include activities/deliverables such as the following:

- Kick-Off Meetings at each facility
- Conceptual Design
- Building and Plant Arrangements
- Technology Screening
- Constructability Plans
- Project Cost Estimates including Cash Flows
- Refined Implementation Schedules

The remainder of the investment funding will cover costs of internal labor and expenses and the use of other external engineering /construction firms to review existing air pollution control technology performance enhancement options. Two examples of this would be hiring Riley Power (the original SCR technology firm) to review/model NO_x emission reduction improvements on the existing Mill Creek 4 SCR that they originally design in 2002 and their review of improvements to the Mill Creek FGDs similar to the improvements they designed for TC1's FGD improvements as part of the TC2 Project.

Project timeline:

Level I Engineering	Begin	Complete
Mill Creek	August 2010	March 2011
Ghent	October 2010	April 2011
Brown	January 2011	May 2011

Economic Analysis and Risks

No economic or risk analyses have been performed as this request seeks only sanction to continue refining and developing the scopes, schedules and cost estimates for projects throughout the coal-fired fleet within LG&E and KU to comply with pending air regulations. Each project identified in this continuance of studies will seek sanction independent of this sanction and thus will have economic and risk analyses performed specifically for each project or coal-fired unit.

Assumptions

Assumptions that will be used as a basis for the continuance of analyses performed within this sanction are the Energy Services 2011 MTP Assumptions. The primary assumptions are described in the Background section above.

Financial Summary (\$000s)

None performed. This sanction will be capitalized and spread pro-rata across the air compliance projects that are sanctioned in the future.

Cash Flow Comparison (\$000s)

Project Expenditures (\$Millions)	2010	2011	Total
2010 MTP/LTP	\$0.0	\$0.0	\$0.0
Current Proposal	\$.75	\$1.25	\$2.0

Sensitivities

None performed.

Risks

The 2011 draft MTP includes approximately \$3 billion in air compliance projects identified with scope identification, schedules and cost estimates based on minimum (much less than Level I Engineering) engineering analyses. Disapproving this sanction will result in the continuance of generation planning for compliance with pending or proposed air regulations with scopes, schedules and estimates that have a significant margin of error.

Other Alternatives Considered

None

Conclusions and Recommendation

It is the recommendation of Project Engineering and Power Production to approve the continuance of studying and analyzing the scopes and options necessary to comply with pending or proposed air compliance regulations for the KU and LG&E coal-fired generating units. The continuance of these studies will lead to better definition of scopes, implementation schedules and cost estimates of major capital projects to comply with the air regulations that will be incorporated into the 2011 and 2012 MTP plans. Approval is also requested to award B&V a sole source award for \$1.6 million on a time-and-material basis for Phase II of the Air Compliance portion of the 2011 MTP.

Eileen Saunders
Manager Major Capital Projects

Scott Straight
Director Project Engineering

John Voyles
VP Transmission & Gen. Services

Ralph Bowling
VP Power Production

Paul Thompson
SVP Energy Services

Brad Rives
Chief Financial Officer

Victor Staffieri
Chief Executive Officer

AUTHORIZATION FOR INVESTMENT PROPOSAL - REVISION

 LG&E and KU Services Co. Louisville Gas and Electric Co. Kentucky Utilities Company

Name of Project: Envir Compliance Study-Air-LGE		Funding Project Type: LGE Steam NonBlnk Excluding Land	
Date Requested: 8/5/2010	Project Number: 131693	Budgeted: no	
Related Project Numbers: 131694		If unbudgeted, list alternate budget ref. Number(s): Approved by Investment Committee on 9-3-10	
Expected Start Date: 1/1/2010	Expected In Service Date: 1/1/2014	Expected Completion Date: 3/31/2014	
AIP Prepared by: Mooney, Michael Allen		Phone: 502/627-3671	
Project Manager: Saunders, Eileen		Phone: 502/627-2431	
Asset Location: Mill Creek Unit 4		Environmental Code: Air	
Resp. Center: 002020-GENERATION SUPPORT - LGE		Product Code: 111 - WHOLESALE GENERATION	

REASONS AND DETAILED DESCRIPTION OF PROJECT

131693-Envir Compliance Study-Air-LGE

Environmental Compliance Studies - Air for Mill Creek

AIP is being increased from \$2.0M to \$2.25M. This is a result of combining the Mercury Compliance Studies with the Environmental Air Studies. The Air Studies were approved by the IC on 9-3-10. It should have included the \$250k for the Mercury Compliance Study (projects 125607 & 125609) actuals that were moved to the Environmental Air Studies (131693 & 131694) in Sept 2010.

AIP is requesting \$2M for Environmental Air Studies for Mill Creek on LGE (36%), Ghent and Brown (64%) on KU. To be going to IC on 8-26-10. Approved by IC on 9-3-10

Costs	Capital Investment	Cost of Removal/Retirement	Capital Cost Subtotal	Initial O&M Cost	Lifetime Maintenance Cost	O&M Cost Subtotal	TOTAL INVESTMENT
	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Company Labor	\$57,232.01	\$0.00	\$57,232.01	\$0.00	\$0.00	\$0.00	\$57,232.01
Contract Labor	\$2,191,683.36	\$0.00	\$2,191,683.36	\$0.00	\$0.00	\$0.00	\$2,191,683.36
Other	\$1,073.15	\$0.00	\$1,073.15	\$0.00	\$0.00	\$0.00	\$1,073.15
Local Engineering	\$11.48	\$0.00	\$11.48	\$0.00	\$0.00	\$0.00	\$11.48
Subtotal - GAAP	\$2,250,000.00	\$0.00	\$2,250,000.00	\$0.00	\$0.00	\$0.00	\$2,250,000.00
Net Expenditures - GAAP	\$2,250,000.00	\$0.00	\$2,250,000.00	\$0.00	\$0.00	\$0.00	\$2,250,000.00
Net Expenditures - IFRS	\$2,250,000.00	\$0.00	\$2,250,000.00	\$0.00	\$0.00	\$0.00	\$2,250,000.00
2010 Total	\$797,851.62	\$0.00	\$797,851.62	\$0.00	\$0.00	\$0.00	\$797,851.62
2011 Total	\$1,452,148.38	\$0.00	\$1,452,148.38	\$0.00	\$0.00	\$0.00	\$1,452,148.38
2012 Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Approval Type: Non-IT Projects

Authorized by	Amount	Name	Date Approved	Req'd
Supervisor	\$25,000.00			N
Manager	\$100,000.00	Saunders, Eileen	3/9/2011	Y
Budget Coordinator	\$0.00	Ritchey, Stacy	3/9/2011	Y
Budget Coordinator	\$0.00	Mooney, Michael Allen	3/9/2011	Y
Director	\$300,000.00	Straight, Ronald	3/21/2011	Y
Vice President	\$750,000.00	Voyles, John	3/22/2011	Y
Investment Committee Coordinator	\$0.00	Chapman, Laura	3/23/2011	Y
Financial Planning Director	\$0.00	Garrett, Christopher	3/23/2011	Y
Senior Officer	\$1,000,000.00	Thompson, Paul	3/24/2011	Y
CFO	\$1,000,001.00	Rives, Stephen		Y
CEO	\$1,000,002.00	Staffieri, Victor		Y
Property Accounting	\$0.00	Rose, Bruce		Y

INVESTMENT MATERIALS

UOP #	Utility Account Id		Quantity	Total Cost	
06677	131100	MISCELLANEOUS STRUCTURES (066	0	\$810,000.00	

RETIRED EQUIPMENT (OR MATERIALS)

UOP #	Utility Account Id		Quantity	Vintage Year	Original Project Number

AIP QUESTIONS**Are there Related Project Numbers?**

Provide related project numbers or indicate 'N/A'.

131694**Is this an IT related project?**

IT project is any project that requires IT involvement or the purchase of hardware and software.

no**Purchase/Sale of Real Estate?**

Is this a transaction related to the sale/purchase of land or buildings?

no**Budgeted?**

Is the project budgeted or unbudgeted?

no

AIP QUESTIONS**Alternate Budget Numbers?**

If the project is unbudgeted, list alternate budget reference numbers. Enter N/A, if none.

Approved by Investment Committee on 9-3-10

Legal Asset Retirement Obligation?

Is there a legal or environmental requirement governing disposal of this asset?

no

Leased Asset?

Does this project involve a leased asset?

no

Obsolete Inventory?

Will this project create obsolete inventory?

no

Environmental Project

Is this an Environmental Project?

yes

Environmental Cost Recovery

If an environmental project, is this an approved environmental cost recovery (ECR) project?

no

ECR Project Type

If this is an ECR project, indicate the project type.

Air

ECR Compliance Number

If this is an ECR project, provide the ECR compliance plan number (see the approved project list on the Rates and Regulatory intranet site).

Not Assigned Yet

Environmental Affairs

Does Environmental Affairs need to review this project for environmental permitting issues (based on responses to the six questions in the Investment Proposal)?

no

Research and Experimental Credit

Is this an experimental project with the purpose of improving, enhancing, or adding to a current manufacturing process?

no

Sales Tax-Pollution Control

Is this project done for environmental regulations or statutes? (If yes, may qualify for the Pollution Control Exemption.)

no

Sales Tax-Manufacturing Integration

Is this project integrated in the Manufacturing Process? (Yes to this question and the following two questions may qualify for the New and Expanded Exemption.)

no

Sales Tax-State Equipment Use

Is this equipment used in the state for the first time?

no

Sales Tax-Upgrade or Improvement?

Is this project considered an upgrade or improvement? If yes, enter description on next line.

no

Sales Tax-Upgrade Description

Description of upgrade, if applicable (i.e., improved materials, increased capacity, longer life, etc.) from prior question. Enter N/A, if not applicable.

N/A

This AIP request is for an additional \$250k for a total of \$2.25M. This request is not for additional money, but rather a combination of projects. The Environmental Air Studies AIP was originally for \$2.0M and was approved by the investment committee in Sept 2010, but did not include the approved Mercury Study dollars. Mercury Compliance Studies was approved by the investment committee in May 2009. These studies were conducted in 2009 and 2010. In Sept 2010, it was decided to combine the Mercury Compliance Studies (125607 & 125609) with the newly approved Environmental Air Studies (131693 & 131694). All charges to the Mercury Compliance projects were moved to the Environmental Air Studies in Sept 2010.

From: Farr, Paul
To: Rives, Brad
Sent: 5/11/2011 8:36:54 AM
Subject: Re: Bag Houses

Thx much.

Sent from my BlackBerry Wireless Handheld

From: Rives, Brad [mailto:Brad.Rives@lge-ku.com]
Sent: Wednesday, May 11, 2011 08:33 AM
To: Farr, Paul
Cc: Voyles, John N
Subject: FW: Bag Houses

Here is a summary of current estimates. Note amounts are still subject to change.

From: Voyles, John
Sent: Wednesday, May 11, 2011 8:32 AM
To: Rives, Brad
Subject: RE: Bag Houses

Brad,

Here's the information:

Pending final engineering assessments, we currently plan to construct 11 baghouses (currently the plan is to have 1 baghouse for Brown 1 & 2 combined) .

The costs which we have in the plan and our ECR filing includes supporting subsystems required for retrofit applications as well (these subsystems include lime and carbon injection systems, any needed ductwork, new fans and associated electrical system upgrades).

Assuming regulatory approvals, the installations will begin in 2012 and conclude in late 2015.

The costs range from approximately \$300 to \$470 per kw installed.

Rough costs per unit:

Brown 1&2 = \$95M
Brown 3 = \$ 80M
Ghent 1 = \$155M
Ghent 2 = \$165M
Ghent 3 = \$190M
Ghent 4 = \$175M
Trimble 1 = \$165M
Mill Creek 1 = \$155M
Mill Creek 2 = \$150M
Mill Creek 3 = \$140M
Mill Creek 4 = \$150M

JV

From: Rives, Brad
Sent: Wednesday, May 11, 2011 7:06 AM
To: Voyles, John
Subject: Fwd: Bag Houses

Can you provide a quick response please? Thx

Sent from my iPhone

Begin forwarded message:

From: "Farr, Paul" <PFarr@pplweb.com>
Date: May 11, 2011 6:26:13 AM EDT
To: "Rives, Stephen B" <brad.rives@lge-ku.com>
Subject: Bag Houses

How many will we be installing, at what rough cost per installation and over what time frame?

Sent from my BlackBerry Wireless Handheld

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From: PAUL.THOMPSON@LGE-KU.COM
To: Rives, Brad
Sent: 6/7/2011 1:47:34 PM
Subject: AIP Project Approval - 131693 - REVISION
Attachments: 131693-30.pdf; Env Air Addtl SSA fund request.docx; Project131693.docx

LG&E project number 131693 (Envir Compliance Study-Air-LGE) has been submitted for your approval. Please login to PowerPlant and respond to the items awaiting your approval.

[login to powerplant](#)

AUTHORIZATION FOR INVESTMENT PROPOSAL - REVISION

 LG&E and KU Services Co. Louisville Gas and Electric Co. Kentucky Utilities Company

Name of Project: Envir Compliance Study-Air-LGE		Funding Project Type: LGE Steam NonBlnk Excluding Land	
Date Requested: 8/5/2010	Project Number: 131693	Budgeted: yes	
Related Project Numbers: 131694		If unbudgeted, list alternate budget ref. Number(s): Approved by Investment Committee on 5-27-11 for additional \$1.0M	
Expected Start Date: 1/1/2010	Expected In Service Date: 1/1/2014	Expected Completion Date: 3/31/2014	
AIP Prepared by: Mooney, Michael Allen		Phone: 502/627-3671	
Project Manager: Saunders, Eileen		Phone: 502/627-2431	
Asset Location: Mill Creek Unit 4		Environmental Code: Air	
Resp. Center: 002020-GENERATION SUPPORT - LGE		Product Code: 111 - WHOLESALE GENERATION	

REASONS AND DETAILED DESCRIPTION OF PROJECT

131693-Envir Compliance Study-Air-LGE

Environmental Compliance Studies - Air for Mill Creek

AIP is requisitioning an additional authorization of \$1.0M to Black & Veatch engineering contract to begin the project specification development and procurement efforts of major equipment necessary to support the Environmental Air Compliance implementation activities. The additional \$1.0 was approved by the Investment Committee on 5-27-11 and will bring the total AIP approval to \$3.25M.

Previous Approvals:

AIP is being increased from \$2.0M to \$2.25M. This is a result of combining the Mercury Compliance Studies with the Environmental Air Studies. The Air Studies were approved by the IC on 9-3-10. It should have included the \$250k for the Mercury Compliance Study (projects 125607 & 125609) actuals that were moved to the Environmental Air Studies (131693 & 131694) in Sept 2010.

AIP is requesting \$2M for Environmental Air Studies for Mill Creek on LGE (36%), Ghent and Brown (64%) on KU. To be going to IC on 8-26-10. Approved by IC on 9-3-10

Costs	Capital Investment	Cost of Removal/ Retirement	Capital Cost Subtotal	Initial O&M Cost	Lifetime Maintenance Cost	O&M Cost Subtotal	TOTAL INVESTMENT
	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Company Labor	\$141,217.87	\$0.00	\$141,217.87	\$0.00	\$0.00	\$0.00	\$141,217.87
Contract Labor	\$3,059,827.28	\$0.00	\$3,059,827.28	\$0.00	\$0.00	\$0.00	\$3,059,827.28
Materials	\$46,185.50	\$0.00	\$46,185.50	\$0.00	\$0.00	\$0.00	\$46,185.50
Other	\$2,757.87	\$0.00	\$2,757.87	\$0.00	\$0.00	\$0.00	\$2,757.87
Local Engineering	\$11.48	\$0.00	\$11.48	\$0.00	\$0.00	\$0.00	\$11.48
Subtotal - GAAP	\$3,250,000.00	\$0.00	\$3,250,000.00	\$0.00	\$0.00	\$0.00	\$3,250,000.00
Net Expenditures - GAAP	\$3,250,000.00	\$0.00	\$3,250,000.00	\$0.00	\$0.00	\$0.00	\$3,250,000.00
2010 Total	\$797,851.62	\$0.00	\$797,851.62	\$0.00	\$0.00	\$0.00	\$797,851.62
2011 Total	\$2,452,148.38	\$0.00	\$2,452,148.38	\$0.00	\$0.00	\$0.00	\$2,452,148.38
2012 Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2013 Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2014 Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Approval Type: Non-IT Projects

Authorized by	Amount	Name	Date Approved	Req'd
Supervisor	\$25,000.00			N
Manager	\$100,000.00	Saunders, Eileen	5/31/2011	Y
Budget Coordinator	\$0.00	Ritchey, Stacy	5/31/2011	Y
Budget Coordinator	\$0.00	Mooney, Michael Allen	5/31/2011	Y
Director	\$300,000.00	Imber, Phillip for Straight, Ronald	5/31/2011	Y
Vice President	\$750,000.00	Voyles, John	6/1/2011	Y
Investment Committee Coordinator	\$0.00	Chapman, Laura	6/1/2011	Y
Financial Planning Director	\$0.00	Garrett, Christopher	6/2/2011	Y
Senior Officer	\$1,000,000.00	Thompson, Paul	6/7/2011	Y
CFO	\$1,000,001.00	Rives, Stephen		Y
CEO	\$1,000,002.00	Staffieri, Victor		Y
Property Accounting	\$0.00	Rose, Bruce		Y

INVESTMENT MATERIALS

UOP #	Utility Account Id		Quantity	Total Cost	
06661	131100	MISC PERMANENT STRUCTURES (06	0	\$501,309.61	
06677	131100	MISCELLANEOUS STRUCTURES (066	0	\$810,000.00	

RETIRED EQUIPEMENT (OR MATERIALS)

UOP #	Utility Account Id		Quantity	Vintage Year	Original Project Number

AIP QUESTIONS

Are there Related Project Numbers?

Provide related project numbers or indicate 'N/A'.

131694

Is this an IT related project?

IT project is any project that requires IT involvement or the purchase of hardware and software.

no

Purchase/Sale of Real Estate?

Is this a transaction related to the sale/purchase of land or buildings?

no

AIP QUESTIONS**Budgeted?**

Is the project budgeted or unbudgeted?

yes**Alternate Budget Numbers?**

If the project is unbudgeted, list alternate budget reference numbers. Enter N/A, if none.

Approved by Investment Committee on 5-27-11 for additional \$1.0M**Legal Asset Retirement Obligation?**

Is there a legal or environmental requirement governing disposal of this asset?

no**Leased Asset?**

Does this project involve a leased asset?

no**Obsolete Inventory?**

Will this project create obsolete inventory?

no**Environmental Project**

Is this an Environmental Project?

yes**Environmental Cost Recovery**

If an environmental project, is this an approved environmental cost recovery (ECR) project?

no**ECR Project Type**

If this is an ECR project, indicate the project type.

Air**ECR Compliance Number**

If this is an ECR project, provide the ECR compliance plan number (see the approved project list on the Rates and Regulatory intranet site).

Not Assigned Yet**Environmental Affairs**

Does Environmental Affairs need to review this project for environmental permitting issues (based on responses to the six questions in the Investment Proposal)?

no**Research and Experimental Credit**

Is this an experimental project with the purpose of improving, enhancing, or adding to a current manufacturing process?

no**Sales Tax-Pollution Control**

Is this project done for environmental regulations or statutes? (If yes, may qualify for the Pollution Control Exemption.)

no**Sales Tax-Manufacturing Integration**

Is this project integrated in the Manufacturing Process? (Yes to this question and the following two questions may qualify for the New and Expanded Exemption.)

no**Sales Tax-State Equipment Use**

Is this equipment used in the state for the first time?

no**Sales Tax-Upgrade or Improvement?**

Is this project considered an upgrade or improvement? If yes, enter description on next line.

no**Sales Tax-Upgrade Description**

Description of upgrade, if applicable (i.e., improved materials, increased capacity, longer life, etc.) from prior question. Enter N/A, if not applicable.

N/A

Investment Proposal for IC:	Electronic	
Project Name:	MTP and 2011 ECR Engineering- Air Compliance Projects	
Total Expenditures:	\$3,250k (including an incremental \$1,000k)	
Sole Source Authorization	\$2,013k (including an incremental \$413k)	
Project Number:	131693 LG&E	131694 - KU
Business Unit/Line of Business:	Project Engineering	
Prepared/Presented By:	Eileen Saunders/Scott Straight	

Executive Summary

This request seeks additional authorization of \$1,000K to the existing Black & Veatch (“B&V”) engineering contract to begin the project specification development and procurement efforts of major equipment necessary to support the Environmental Air Compliance implementation activities.

On September 2, 2010, \$2,000K was authorized by the Investment Committee to continue to refine the scopes, implementation schedules and cost estimates originally identified in the development of the 2011 MTP. The B&V engineering firm was retained and completed their Phase I effort. This request also includes a sole source award recommendation to award B&V a change order of \$413k to assist Project Engineering and the stations in the development of specifications for the 12 Pulse Jet Fabric Filters (baghouses) for E.W. Brown, Mill Creek, Ghent and Trimble County 1, as well as the development and bid supporting for the Wet FGD specifications for Mill Creek and fan specifications for all units listed in the 2011 ECR filing.

The remainder of the sanction will cover costs of internal labor, as well as the use of other engineering or construction firms as necessary to support the specification development effort.

The Environmental Air Studies Investment Proposal was originally for \$2,000k and was approved by the Investment Committee in September of 2010, but did not include the separately approved Mercury Study dollars. The Mercury Compliance Study was approved for \$250k in May, 2009. These studies were conducted in 2009 and 2010. In September 2010, it was decided to combine the \$250k Mercury Compliance Studies (Project numbers 125607 & 125609) with the newly approved Environmental Air Studies (Project numbers 131693 & 131694) for a total of \$2.25 million. This was due to the fact that the Hazardous Air Pollutants (HAPS) Maximum Achievable Control Technology (MACT) proposed rules included mercury as one of the pollutants. All charges to the Mercury Compliance projects were moved to the Environmental Air Studies in September 2010.

Background

The background for this work is detailed in the original IC paper from August 31, 2010. Essentially, this authorization will give Project Engineering the ability to begin putting the procurement strategies in place that will enable us to react in a more timely fashion upon receipt of the ECR approvals and receipt of the EPA final ruling in November, 2011.

Project Description

The purpose of this scope of work is for B&V to support LG&E and KU with its Global Purchase Program of Air Quality Control Equipment at the Mill Creek, Ghent, Brown, and Trimble County facilities. B&V will assist LG&E and KU with the following 3 Tasks:

Task 1 – Wet FGD Specification Development and Support through Award

Task 2 – Pulse Jet Fabric Filter (PJFF) Specification Development and Support through Award

Task 3 – Fan Specification Development and Support through Award

Project Timeline

Project	Begin	Complete
Phase I Engineering	April, 2010	May, 2010
Phase II Engineering	August, 2010	July, 2011
Specification Development	May, 2011	August, 2011

Procurement activities will take place through the end of 2011.

Economic Analysis and Risks

No economic or risk analyses have been performed as this request seeks only to sanction continuing efforts to refine scopes in support of specification development.

Assumptions

Assumptions that will be used as a basis for the continuance of analyses performed within this sanction are the Energy Services 2011 MTP Assumptions. The primary assumptions are described in the background from the original authorization which is attached to this document.

Financial Summary (\$000s)

Contract Expenditures (\$000s)

Project Expenditures (\$Millions)	2010	2011	Total
2011 MTP/LTP	\$1.25	\$0.75	\$2.00
Transfer Mercury Comp. Study	\$0.25	\$0.00	\$0.25
Current Proposal	\$0.80	\$2.45	\$3.25
Variance to 2011 MTP	\$0.70	(\$1.70)	(\$1.00)

The project variance for 2011 will be covered within the overall environmental air budget from the 2011 MTP through the eventual reallocation of this study being applied across the individual air compliance projects.

Sensitivities

No sensitivities were performed.

Environmental

No permits are required for this engineering work.

Risks

The implementation schedule associated with the new regulatory requirements is extremely challenging. Getting to the market place as soon as possible will decrease risk of equipment/material shortages in the market associated with most other coal-fired generators likely requiring the same technologies and equipment.

Other Alternatives Considered

None.

Conclusions and Recommendation

It is the recommendation of Project Engineering that the Investment Committee approve the sanction increase to the MTP Engineering- Air Compliance project from \$2,250k (including \$250k transferred from the mercury studies) to a total revised sanction of \$3,250K. In addition, authority is requested to raise the SSA amount to B&V from \$1,600k to \$2,013k. This will allow the continuance of the studying and analyzing of the scopes and options necessary to develop the specifications and procurement plan for the purchase of Pulse Jet Fabric Filters for twelve units, Wet FGDs for Mill Creek Units 1&2 and Fans for all units that require an upgrade.

Eileen Saunders
Manager – Major Capital Projects
Project Engineering

R. Scott Straight
Director
Project Engineering

John N. Voyles
VP Transmission/Gen. Services

D. Ralph Bowling
VP Power Production

S. Bradford Rives
Chief Financial Officer

Paul W. Thompson
SVP Energy Services

Victor A. Staffieri
Chief Executive Officer

From: Kuhl, Megan
Sent: Wednesday, June 01, 2011 4:43 PM
To: Chapman, Laura
Subject: FW: E-MAIL VOTE SOLICITED: Additional Engineering - Air Compliance Projects

From: Kuhl, Megan
Sent: Friday, May 27, 2011 11:57 AM
To: Hudson, Rusty
Subject: FW: E-MAIL VOTE SOLICITED: Additional Engineering - Air Compliance Projects

The Additional Engineering - Air Compliance Projects has been approved by the Investment Committee.

From: Kuhl, Megan
Sent: Friday, May 20, 2011 4:12 PM
To: Rives, Brad; Thompson, Paul; McCall, John; Hermann, Chris; Blake, Kent; Sinclair, David
Cc: Garrett, Chris; Neal, Susan; Kaiser, Pat; Novak, Lana; Hudson, Rusty
Subject: E-MAIL VOTE SOLICITED: Additional Engineering - Air Compliance Projects

This request seeks additional authorization of \$1,000K to help further refine the scopes, implementation schedules, and cost estimates for the environmental air program. This will increase the project from \$2,250k to a total revised sanction of \$3,250K.

Authority is also requested to raise the SSA amount to Black and Veatch (B&V) from \$1,600k to \$2,013k as part of the overall \$1,000K request. This will allow the continuance of the studying and analyzing of the scopes and options necessary to develop the specifications and procurement plan for the purchase of Pulse Jet Fabric Filters for twelve units, Wet FGDs for Mill Creek Units 1&2, and Fans for all units that require an upgrade.

The project variance for 2011 will be covered within the overall environmental air budget from the 2011 MTP.

Please send your approval/rejection by COB Wednesday, May 25th.

Thanks,

Megan Kuhl
Financial Analyst II, Financial Planning
LG&E and KU Services Company
(502) 627-3716

From: RUSTY.HUDSON@EON-US.COM
To: Rives, Brad
Sent: 9/13/2010 10:56:58 AM
Subject: AIP Project Approval - 131693 - ORIGINAL
Attachments: 2011 MTP Level I Engineering - Air Compliance Projects.docx; 131693-6.pdf

LG&E project number 131693 (Envir Compliance Study-Air-LGE) has been submitted for your approval. Please login to PowerPlant and respond to the items awaiting your approval.

[login to powerplant](#)

Investment/Contract Proposal for IC: e-mail vote on 8/27/10

Project Name:	MTP Engineering – Air Compliance Projects	
Total Expenditures:	\$2,000K	
Sole Source Amount:	\$1,600K	
Project Number:	131693 – LG&E	131694 - KU
Business Unit/Line of Business:	LG&E and KU Coal-Fired Generation	
Prepared/Presented By:	Eileen Saunders/Scott Straight	

Executive Summary

This request seeks authorization of \$2,000K to continue refining the scopes, implementation schedules and cost estimates of projects identified in the development of the 2011 MTP as necessary for compliance with proposed or final local, State and Federal air compliance regulations through 2016.

In addition to requesting approval of a new engineering project that will continue refining the 2011 MTP air compliance scope, this request also seeks approval of a sole source award to Black & Veatch (B&V) engineering firm. B&V will perform the majority of studies included in the \$2 million project sanction request; however, smaller valued contracts will be awarded to various technology firms to perform miscellaneous reviews of the LG&E and KU existing air pollution control technologies for potential upgrades to their performance.

Background

Starting this year and continuing for the next two years, the United States Environmental Protection Agency (USEPA) will be developing and implementing several new environmental regulations. These new regulations will significantly impact our coal-fired electric generating units and will affect all environmental areas of air, water and land. The pollutants targeted in three of the new air regulations are SO₂ and NO_x. There is a recent new 1-hour National Ambient Air Quality Standard (NAAQS) for SO₂ and NO_x that will require lower emission rates at several of the stations and the CAIR rule is proposed to be replaced by a new Clean Air Transport Rule (CATR). Each will require additional reductions in SO₂ and NO_x. In 2011, the USEPA is expected to propose and finalize an Electric Utility Maximum Achievable Control Technology Rule (MACT). The MACT rule will require significant reductions in hazardous air pollutants such as mercury and acid gases (i.e., SO₃/H₂SO₄ emissions) which are also emitted from the LG&E and KU coal-fired electric generation fleet.

In May of 2010, Project Engineering was asked to investigate the technological and financial impacts of new environmental air regulations on the KU and LG&E coal-fired units. B&V was hired through a competitive bid process at a contract valued at \$149K and given six weeks to provide a high level estimate based on site visits, data collection from the plants and industry experience. As a result of this Phase I effort, approximately \$3 billion (escalated) of Air

Emissions Mitigation System additions and retrofits were identified as possible scenarios for bringing the fleet into compliance with the projected standards.

Through the approval of this investment/contract proposal, B&V will be contracted with to continue with Phase II of the engineering and estimating effort. This effort will provide a facility-specific project definition consisting of conceptual designs and budgetary cost estimates for selected air quality control technologies. This effort will result in a Level 1 Engineering assessment for Mill Creek, Ghent and EW Brown. The work for each facility will be staggered with the Mill Creek effort commencing first.

Award of the Phase II work to B&V will provide continuity to the initial study work. The contract will be on a time and material basis, not-to-exceed sole source contract, with a value of \$1.6M. Black and Veatch will keep their original team in place to gain efficiencies for the Phase II work. The scope of their work will include activities/deliverables such as the following:

- Kick-Off Meetings at each facility
- Conceptual Design
- Building and Plant Arrangements
- Technology Screening
- Constructability Plans
- Project Cost Estimates including Cash Flows
- Refined Implementation Schedules

The remainder of the investment funding will cover costs of internal labor and expenses and the use of other external engineering /construction firms to review existing air pollution control technology performance enhancement options. Two examples of this would be hiring Riley Power (the original SCR technology firm) to review/model NO_x emission reduction improvements on the existing Mill Creek 4 SCR that they originally design in 2002 and their review of improvements to the Mill Creek FGDs similar to the improvements they designed for TC1's FGD improvements as part of the TC2 Project.

Project timeline:

Level I Engineering	Begin	Complete
Mill Creek	August 2010	March 2011
Ghent	October 2010	April 2011
Brown	January 2011	May 2011

Economic Analysis and Risks

No economic or risk analyses have been performed as this request seeks only sanction to continue refining and developing the scopes, schedules and cost estimates for projects throughout the coal-fired fleet within LG&E and KU to comply with pending air regulations. Each project identified in this continuance of studies will seek sanction independent of this sanction and thus will have economic and risk analyses performed specifically for each project or coal-fired unit.

Assumptions

Assumptions that will be used as a basis for the continuance of analyses performed within this sanction are the Energy Services 2011 MTP Assumptions. The primary assumptions are described in the Background section above.

Financial Summary (\$000s)

None performed. This sanction will be capitalized and spread pro-rata across the air compliance projects that are sanctioned in the future.

Cash Flow Comparison (\$000s)

Project Expenditures (\$Millions)	2010	2011	Total
2010 MTP/LTP	\$0.0	\$0.0	\$0.0
Current Proposal	\$.75	\$1.25	\$2.0

Sensitivities

None performed.

Risks

The 2011 draft MTP includes approximately \$3 billion in air compliance projects identified with scope identification, schedules and cost estimates based on minimum (much less than Level I Engineering) engineering analyses. Disapproving this sanction will result in the continuance of generation planning for compliance with pending or proposed air regulations with scopes, schedules and estimates that have a significant margin of error.

Other Alternatives Considered

None

Conclusions and Recommendation

It is the recommendation of Project Engineering and Power Production to approve the continuance of studying and analyzing the scopes and options necessary to comply with pending or proposed air compliance regulations for the KU and LG&E coal-fired generating units. The continuance of these studies will lead to better definition of scopes, implementation schedules and cost estimates of major capital projects to comply with the air regulations that will be incorporated into the 2011 and 2012 MTP plans. Approval is also requested to award B&V a sole source award for \$1.6 million on a time-and-material basis for Phase II of the Air Compliance portion of the 2011 MTP.

Eileen Saunders
Manager Major Capital Projects

Scott Straight
Director Project Engineering

John Voyles
VP Transmission & Gen. Services

Ralph Bowling
VP Power Production

Paul Thompson
SVP Energy Services

Brad Rives
Chief Financial Officer

Victor Staffieri
Chief Executive Officer

AUTHORIZATION FOR INVESTMENT PROPOSAL - ORIGINAL

 EON U.S. Services Co. Louisville Gas and Electric Co. Kentucky Utilities Company

Name of Project: Envir Compliance Study-Air-LGE		Funding Project Type: LGE Steam NonBlnk Excluding Land	
Date Requested: 8/5/2010	Project Number: 131693	Budgeted: no	
Related Project Numbers: 131694		If unbudgeted, list alternate budget ref. Number(s): Going before Investment Committee on 8-26-10	
Expected Start Date: 1/1/2010	Expected In Service Date: 12/31/2011	Expected Completion Date: 3/31/2012	
AIP Prepared by: Mooney, Michael Allen		Phone: 502/627-3671	
Project Manager: Saunders, Eileen		Phone: 502/627-2431	
Asset Location: Mill Creek Unit 4		Environmental Code: Air	
Resp. Center: 002020-GENERATION SUPPORT - LGE		Product Code: 111 - WHOLESALE GENERATION	

REASONS AND DETAILED DESCRIPTION OF PROJECT

131693-Envir Compliance Study-Air-LGE

Environmental Compliance Studies - Air for Mill Creek

AIP is requesting \$2M for Environmental Air Studies for Mill Creek on LGE (36%), Ghent and Brown (64%) on KU. To be going to IC on 8-26-10.
Approved by IC on 9-3-10

Costs	Capital Investment	Cost of Removal/Retirement	Capital Cost Subtotal	Initial O&M Cost	Lifetime Maintenance Cost	O&M Cost Subtotal	TOTAL INVESTMENT
	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Contract Labor	\$2,000,000.00	\$0.00	\$2,000,000.00	\$0.00	\$0.00	\$0.00	\$2,000,000.00
Subtotal - GAAP	\$2,000,000.00	\$0.00	\$2,000,000.00	\$0.00	\$0.00	\$0.00	\$2,000,000.00
Net Expenditures - GAAP	\$2,000,000.00	\$0.00	\$2,000,000.00	\$0.00	\$0.00	\$0.00	\$2,000,000.00
Net Expenditures - IFRS	\$2,000,000.00	\$0.00	\$2,000,000.00	\$0.00	\$0.00	\$0.00	\$2,000,000.00
2010 Total	\$1,250,000.00	\$0.00	\$1,250,000.00	\$0.00	\$0.00	\$0.00	\$1,250,000.00
2011 Total	\$750,000.00	\$0.00	\$750,000.00	\$0.00	\$0.00	\$0.00	\$750,000.00
2012 Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Approval Type: Non-IT Projects

Authorized by	Amount	Name	Date Approved	Req'd
Supervisor	\$25,000.00			N
Manager	\$100,000.00	Clements, Joseph	9/8/2010	Y
Budget Coordinator	\$0.00	Ritchey, Stacy	9/8/2010	Y
Special Approvers	\$0.00	Saunders, Eileen	9/8/2010	Y
Budget Coordinator	\$0.00	Dowd, Deborah	9/10/2010	Y
Director	\$300,000.00	Saunders, Eileen for Straight, Ronald	9/10/2010	Y
Vice President	\$750,000.00	Voyles, John	9/10/2010	Y
Investment Committee Coordinator	\$0.00	Wright, Sharon	9/10/2010	Y
Financial Planning Director	\$0.00	Garrett, Christopher	9/13/2010	Y
Senior Officer	\$1,000,000.00	Hudson, Russel for Thompson, Paul	9/13/2010	Y
CFO	\$1,000,001.00	Rives, Stephen		Y
CEO	\$1,000,002.00	Staffieri, Victor		Y
Property Accounting	\$0.00	Rose, Bruce		Y

INVESTMENT MATERIALS

UOP #	Utility Account Id		Quantity	Total Cost	
06677	131100	MISCELLANEOUS STRUCTURES (066	0	\$720,000.00	

RETIRED EQUIPEMENT (OR MATERIALS)

UOP #	Utility Account Id		Quantity	Vintage Year	Original Project Number

AIP QUESTIONS**Are there Related Project Numbers?**

Provide related project numbers or indicate 'N/A'.

131694**Is this an IT related project?**

IT project is any project that requires IT involvement or the purchase of hardware and software.

no**Purchase/Sale of Real Estate?**

Is this a transaction related to the sale/purchase of land or buildings?

no**Budgeted?**

Is the project budgeted or unbudgeted?

no

AIP QUESTIONS**Alternate Budget Numbers?**

If the project is unbudgeted, list alternate budget reference numbers. Enter N/A, if none.

Going before Investment Committee on 8-26-10

Legal Asset Retirement Obligation?

Is there a legal or environmental requirement governing disposal of this asset?

no

Leased Asset?

Does this project involve a leased asset?

no

Obsolete Inventory?

Will this project create obsolete inventory?

no

Environmental Project

Is this an Environmental Project?

yes

Environmental Cost Recovery

If an environmental project, is this an approved environmental cost recovery (ECR) project?

yes

ECR Project Type

If this is an ECR project, indicate the project type.

Air

ECR Compliance Number

If this is an ECR project, provide the ECR compliance plan number (see the approved project list on the Rates and Regulatory intranet site).

Not Assigned Yet

Environmental Affairs

Does Environmental Affairs need to review this project for environmental permitting issues (based on responses to the six questions in the Investment Proposal)?

no

Research and Experimental Credit

Is this an experimental project with the purpose of improving, enhancing, or adding to a current manufacturing process?

no

Sales Tax-Pollution Control

Is this project done for environmental regulations or statutes? (If yes, may qualify for the Pollution Control Exemption.)

no

Sales Tax-Manufacturing Integration

Is this project integrated in the Manufacturing Process? (Yes to this question and the following two questions may qualify for the New and Expanded Exemption.)

no

Sales Tax-State Equipment Use

Is this equipment used in the state for the first time?

no

Sales Tax-Upgrade or Improvement?

Is this project considered an upgrade or improvement? If yes, enter description on next line.

no

Sales Tax-Upgrade Description

Description of upgrade, if applicable (i.e., improved materials, increased capacity, longer life, etc.) from prior question. Enter N/A, if not applicable.

N/A