Date: 3/1/83

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In The Matter of	)	
	)	
COMMONWEALTH EDISON COMPANY	)	Docket Nos. 50-454 OL
	)	50-455 OL
(Byron Nuclear Power Station, Units 1 & 2)	)	

SUMMARY OF TESTIMONY OF DONALD POPE

Mr. Pope is a concrete batch plant operator for Blount Brothers Corporation at Byron Station, and in that capacity he trained and worked with Daniel Gallagher. His testimony is offered in response to the allegations Mr. Gallagher made in support of DAARE-SAFE and League Contention 1A, which challenges the adequacy of quality assurance at the Byron site.

Mr. Pope begins his testimony by describing his responsiblities as a concrete batch plant operator and the duties performed by Mr. Gallagher. (pp. 1-3). He next describes the operations of the two concrete plants that were at Byron Station while Mr. Gallagher worked for Blount Brothers. The ErieStrayer plant was a computer-controlled "wet batch" plant, while the Ross plant was a manually-operated "dry batch" plant. (pp. 3-6). Mr. Pope's testimony then turns to the documentation of batches of concrete. Concrete was ordered by a pour slip, and a batch ticket was generated for each batch of concrete. (pp. 7-9).

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The testimony then turns to the tests which were performed on the concrete to ensure that it met specifications. A series of tests was conducted on concrete batches, including slump tests, which determined the amount of water in the concrete, and cylinder tests, which measured the strength of the concrete. If a batch of concrete failed a test the concrete either would be rejected, if it had not already been placed, or would be appropriately tested further, if it already had been placed. (pp. 9-13).

Mr. Pope's testimony next addresses the specific allegations of Mr. Gallagher's affidavit, beginning with the allegations pertaining to Mr. Gallagher's firing on June 1, 1979. Mr. Gallagher was fired for refusing to operate the Ross plant. The concrete he was asked to mix, and that he refused to mix, was Category II concrete for the cooling towers. Mr. Pope testifies that Mr. Gallagher preferred to work on the Erie-Strayer plant rather than the Ross plant, and that if Mr. Gallagher believed that he had been fired for refusing to mix unsafe concrete he could have filed a grievance with the union. (pp. 13-16).

Mr. Pope subsequently testifies on the issue of improper aggregate raised by Mr. Gallagher in his affidavit. Mr. Pope was concerned about aggregate that he and Mr. Gallagher examined in November, 1975, and he asked to see subsequent cylinder tests. These tests assured Mr. Pope that the aggregate was proper. With regard to Mr. Gallagher's

statements concerning a 1978 condemnation of aggregate, Mr. Pope testifies that the aggregate pile was condemned in March, 1979, as a result of equipment using part of the pile as a ramp to other parts of the pile. This aggregate was condemned and was subsequently rewashed. (pp. 16-19).

After testimony on certain other issues, including batch plant maintenance, Mr. Pope addresses the issue raised by Mr. Gallagher of water added to the concrete. Water is added to concrete to ensure that the concrete is workable. The amount of water that can be added to a batch of concrete is determined by specifications, and monitoring of the number of gallons of water added to the concrete and the performance of slump tests ensure that the concrete does not contain excessive amounts of water. (pp. 20-22).

The final issue addressed by Mr. Pope's testimony is Mr. Gallagher's allegation pertaining to the leakage of oil into cement. Mr. Pope testifies that Glenn Garrison, the pig operator, informed him that a blower in one of the storage bins for cement was losing oil. Blount Brothers immediately withdrew the bin from service and had the blower rebuilt. If significant amounts of oil had gotten into concrete as a result of the oil leak the concrete would have been weakened and therefore would have failed cylinder tests; no such test failures were reported to Mr. Pope. Mr. Pope recently was informed by Vernon Williams, Blount Brothers' project manager at Byron, that the company that owns the

cement storage bin does not know of any occasion in which oil leaked into cement as a result of the type of problem experienced in the bin at Byron. (pp. 23-24).

TESTIMONY OF

DONALD POPE

Q1 Mr. Pope, please state your name for the record.

A1 Donald Pope.

Q2 What is the scope of your testimony?

A2 I am here to testify concerning the allegations made by Daniel Gallagher pertaining to the production of concrete at Commonwealth Edison Company's Byron Station.

Q3 For whom do you presently work?

A3 Blount Brothers Corporation, at Byron.

Q4 What type of work is Blount Brothers doing at Byron?

A4 Blount Brothers is one of the general contractors for structural work, which includes the batching of concrete for the site.

Q5 What is your present position at Blount Brothers?

A5 Batch plant operator.

Q6 What are your responsibilities as a batch plant operator?

A6 I am responsible for maintaining and operating the batch plant at Byron, the batch plant being the place where concrete is mixed for use at the site.

Q7 How long have you been a batch plant operator?

A7 I have been a batch plant operator for sixteen years. Before coming to Byron I was a batch plant operator at the Zion facility, working for Walsh. I began at Byron eight years ago, and I have been there continuously

since that time. I was Blount Brothers' first batch plant operator at Byron.

Q8 Did you train the batch plant operators who came to work at Byron after you had arrived there?

A8 Yes.

Q9 As a batch plant operator are you a union member?

A9 Yes, I am. I belong to Local 150, Operating Engineers, which is the local that all Byron batch plant operators belong to.

Q10 Do you know Daniel Gallagher?

A10 Yes.

Q11 Who is he?

A11 I worked with Mr. Gallagher while he worked for Blount Brothers. At first he worked for me as my oiler, and then he became a batch plant operator. I taught Mr. Gallagher how to operate and maintain the batch plants at the site.

Q12 What is an oiler?

A12 An oiler is more or less an apprentice to the batch plant operator. He's learning the trade, learning how to maintain the equipment and how to mix concrete. So, as an oiler Mr. Gallagher greased and cleaned the plant, and worked with me when I was doing maintenance.

Q13 Did Mr. Gallagher ever become a batch plant operator?

A13 Yes, he did. He gradually learned the position. I looked over his shoulder for a long time until I

finally decided I could walk away for a little bit. I said, "If you've got a problem, don't do anything. Come to me before you ship a load out and we can check it to make sure it's right."

Q14 Mr. Pope, what are the ingredients that go into a concrete mix?

A14 Sand, stone, cement, water, and admixtures. What I have called "sand" is also known as fine aggregate and what I have called "stone" is also known as coarse aggregate. The fine aggregate is made of washed sand, and the coarse aggregate is made of crushed rock.

Q15 While Mr. Gallagher worked for Blount Brothers, how many concrete batch plants were there at the Byron site?

A15 Two, the Erie-Strayer and Ross batch plants.

Q16 How many batch plants are at the site today?

A16 Just one, the Ross plant. The Erie-Strayer plant was dismantled in 1980 when the amount of concrete being poured at the site declined.

Q17 Have you worked as a batch plant operator at both the Erie-Strayer and the Ross plants?

A17 Yes.

Q18 How was concrete mixed at the Erie-Strayer batch plant?

A18 The Erie-Strayer batch plant was a "wet batch" plant, which means that the plant had its own mixing drum from which finished concrete was poured into trucks for delivery to placement sites. This kind of plant is also called a "central mix" plant.

Q19 Does the Ross plant operate differently?

A19 Yes. The Ross plant is a "dry batch" plant, which means that the ingredients are poured "dry" -- unmixed -- into trucks, and the trucks then do the actual mixing of the concrete. By comparison, trucks used at the Erie-Strayer plant were used for transportation purposes only, and simply agitated the concrete on the way to the placement sites.

Q20 How were the various ingredients mixed into concrete at the two plants?

A20 First, each ingredient -- aggregate, cement, water, and so on -- was weighed. On the Erie-Strayer plant a water meter was used instead of a water scale. Then the ingredients were discharged onto a conveyor belt which took the mix to either the central mixing drum, for the Erie-Strayer plant, or to a truck, for the Ross plant. The concrete had to be within a certain temperature range, so ice was added to the mix during the summer and hot water was added during the winter.

The order in which the ingredients were discharged into the mixing receptacle was called the charging sequence, and the process of discharging the ingredients was called tuning the batch plant. The charging sequence was important because it determined the amount of mixing time necessary for the concrete. Any order of discharge of the ingredients ultimately would lead to a good mix, but a good charging sequence would

create a good mix more efficiently.

Q21 Were there differences in the mixing operations at the two batch plants?

A21 Yes. The Erie-Strayer plant was computerized, and the weighing of the ingredients was done automatically by the computer. At the Ross plant, on the other hand, the weighing was done manually. The operator at Ross had to watch the scales and bring each ingredient to the appropriate level. The Erie-Strayer computer would be set to control the entire charging sequence, and would make batch after batch in the same sequence. At the Ross plant the operator would have to manually tune each batch.

Q22 Were the procedures for batching concrete at the two plants documented?

A22 Yes. Blount QA/QC Work Procedure Number Six, set forth the procedures to be followed in batching concrete at the Erie-Strayer plant, and Blount QA/QC Work Procedure Number Sixteen sets forth the procedures to be followed in batching concrete at the Ross plant. Work Procedure Number Six is attached to my testimony as Pope Exhibit 1, and Work Procedure Number Sixteen is attached as Pope Exhibit 2.

Q23 With regard to the Erie-Strayer plant, where was the batch plant operator while he operated the system?

A23 In the control trailer. The trailer was located right next to the plant, so the operator could see the concrete

as it was poured into the trucks. The trailer contained the computer the and the admixture systems. In running the plant the batch plant operator would sit at the computer console.

Q24 What are admixtures?

A24 Admixtures are agents added to the concrete which improve the final product. One admixture is an air-entraining agent which injects air bubbles into the concrete, thereby increasing the concrete's durability during times of freezing and thawing.

Q25 Where would the batch plant operator be while operating the Ross plant?

A25 He would sit right in front of the scales in the same building as the concrete ingredients.

Q26 Was there a difference in working conditions between running the Erie-Strayer plant and the Ross plant?

A26 Quite. The Erie-Strayer plant trailer had air conditioning and electric baseboard heating, and the job was much quieter and less dirty than operating the Ross plant. Operating the Ross plant meant going back to the old system where the operator is sitting right next to his work. He's got rocks falling on his head sometimes.

Q27 At times did you and Mr. Gallagher work together on one or the other plant?

A27 Yes, on the Erie-Strayer plant.

Q28 When you and Mr. Gallagher were working together at the Erie-Strayer plant, what were your respective duties?

A28 Mine were to make sure the concrete got out to where it was wanted when it was wanted and to make sure the plant was maintained and greased. Mr. Gallagher's job was to learn.

Q29 In your view, when you and Mr. Gallagher worked together at Erie-Strayer, was he assisting you?

A29 Yes.

Q30 Mr. Pope, I want to ask you some questions about the documentation of batches of concrete. When you would be working as an operator at one of the two plants, would you receive some kind of an order form indicating how much concrete was to be mixed and for what purpose?

A30 Yes. We would receive a pour slip for every batch of concrete ordered from the batch plants. The pour slip would indicate the destination of the concrete, the type of concrete required -- the mix type -- and how much was to be batched. A pour slip is attached to my testimony as Pope Exhibit 3.

Q31 When the concrete was mixed, was another type of document generated by the batch plant operator?

A31 Yes. A batch ticket would be generated which would describe the concrete mixed. A batch ticket is attached to my testimony as Pope Exhibit 4. The writing on the particular batch ticket marked as Pope Exhibit 4 is

printed instead of handwritten because it was printed out from the Erie-Strayer computer. The initials "D.G." are those of Dan Gallagher, who signed off on this batch.

Q32 This batch ticket is for concrete from the Erie-Strayer plant?

A32 Yes. Batch tickets for the Ross plant were handwritten.

Q33 Was the same form of batch ticket used for both plants?

A33 Yes.

Q34 Was a batch ticket generated for every batch made at either plant?

A34 To my knowledge, yes.

Q35 Please generally summarize, Mr. Pope, what information is shown on a batch ticket.

A35 Each batch ticket gives the date, the mix design, the water trim, the number of cubic yards ordered and delivered, and the truck on which the concrete was delivered. It also gives the aggregate weights, the cement type and weight, the admixtures, the amount of water and the time of day the concrete was batched. After the concrete gets to the placement site, personnel there put on the ticket the time the load was emptied. In summary, the batch ticket reflects the ingredients that have gone into a mix.

Q36 At the bottom of the batch ticket there is a list of four items which is located above where the document

says "authorized signature, testing agent." What are those four items?

A36 The items show the test results on the batch and the amount of water, if any, added to the batch at the placement site.

Q37 Why are the lines labeled "slump," "air content," and "temperature" left blank on Exhibit 4?

A37 Because this particular batch was not one of those tested for these items.

Q38 Where are the tests performed that are referred to at the bottom of the batch ticket?

A38 They are performed at the placement site where the concrete is poured and the information is entered on the ticket by personnel at the placement site.

Q39 After a batch of concrete was mixed at the plant, what happened to the batch ticket?

A39 One copy of the ticket was kept at the batch plant, and four copies, I believe, went out to the placement site. After the concrete was poured, one copy was sent back to the batch plant so that the operator could see what was done, what the test results were. Other copies, I believe, went to Blount Brothers, quality assurance, Blount Brothers production, and Pittsburgh Testing Laboratory.

Q40 When a completed batch ticket was received back at the batch plant, what would be done?

A40 The batch plant operator would read it in order to see if there were any adjustments that had to be made on future batches. Generally, though, the operator would be informed of any problems by radio before the actual ticket got back to the plant.

Q41 Did the concrete mixed at the two batch plants have to meet specifications of any kind?

A41 Yes. The architect-engineer, Sargent & Lundy, required that the concrete meet a long series of specifications.

Q42 Were various tests performed to make sure that the concrete met specifications?

A42 Yes.

Q43 In your position as a batch plant operator, did you keep up with the results of the tests that were being performed on the concrete you were mixing?

A43 Yes. I cannot testify to the specific specifications that the concrete had to meet, since I am not an engineer, but I was aware of what tests were performed on the concrete I was batching and I was aware of the results of the tests.

Q44 What tests were performed on the concrete which was batched at the Byron facility?

A44 The aggregate was regularly tested by Pittsburgh Testing Laboratory. Testing of the aggregate included testing of the percentage of "fines" in the coarse aggregate. Fines are particles which are left in the aggregate when the stone is crushed to make up the aggregate.

Various tests were performed on the mixed concrete. The concrete was tested for air content and temperature. Slump tests also were performed, which indicated the amount of water in the concrete. Another test was the cylinder test, also known as the break test, which indicated the strength of the poured concrete.

Q45 How is a slump test performed?

A45 A sample of concrete is placed in a cone through a hole in the top, and the concrete is then slabbed with a bar or a rod. The cone is placed on a flat surface and is then lifted from the wet concrete. The empty cone is then turned over. The amount by which the released concrete slumps down is measured -- if there are four inches between the concrete and the top of the turned-over cone, the concrete has a four-inch slump. If the distance is three inches, it is a three inch slump and so on.

Q46 Mr. Pope, what does a slump test demonstrate about concrete?

A46 The concrete's water-cement ratio.

Q47 How often were slump tests performed on concrete?

A47 The first ten yards, or first truckload, of each new pour were given a slump test. After that, a slump test was performed every 50 yards of the pour.

Q48 Where were slump tests performed?

A48 At the placement site.

Q49 Did the concrete specifications require particular slump?

A49 Yes. The specifications required that the slump not exceed a certain amount of inches, depending on the temperature of the concrete.

Q50 Why is there a maximum allowable slump?

A50 Because too much water weakens the strength of concrete.

Q51 How is a cylinder test performed?

A51 Cylinders are filled with concrete from a pour, and the concrete is then broken after a certain amount of time by compression. Several cylinders are taken at each test point in a pour, and one cylinder is then given a break test at specified times. A cylinder is broken at 7, 14, 28 and 91 days after the pour. The purpose of the cylinder test is to determine that the concrete reaches required strength, in terms of its ability to withstand pounds per square inch of pressure. The cylinders are tested at the time intervals I have noted in order to made sure that the concrete is hardening as it should after being poured. The cylinder test is the ultimate test of the strength of the concrete. It is the name of the game.

Q52 How often are cylinder tests performed, Mr. Pope?

A52 Like the slump tests, the cylinders are taken after the first 10 yards, or first truckload, of a pour and after each additional 50 yards of the pour.

Q53 Who performed slump and cylinder tests?

A53 Pittsburgh Testing Laboratory.

Q54 If a batch of concrete failed one of the tests performed on it, what would happen?

A54 The batch plant operator would be informed of the test results, and corrective measures would be taken at the batch plant.

Q55 What would be done with the concrete that failed a test?

A55 That depends on whether the concrete already had been placed. If the concrete had not yet been placed, it would either be used as backfill or be thrown away. If the concrete already had been placed by the time test results were known, the results of the cylinder tests would determine if further actions were necessary. If the concrete passed the cylinder tests then the batch was of proper strength, and the concrete would not have to be rejected. If the concrete failed the cylinder tests then further tests would be undertaken to determine the strength of the concrete. Sargent & Lundy would analyze these further tests and would decide whether the concrete had to be rejected even though it already had been placed. I believe that a Deviation Report would be issued if concrete that already had been placed failed tests, so that the possible problem would be carefully monitored until a final determination was made.

Q56 If concrete failed one of the tests listed on the batch ticket, what would be written on the batch ticket?

A56 The ticket would show the failed test. Pope Exhibits 5 and 6 are examples of what happened when concrete failed a test. Exhibit 5 is an Erie-Strayer batch ticket which shows that the batch was rejected because the concrete was too warm, and Exhibit 6 is a Ross batch ticket which shows that the concrete was rejected because of too much slump.

Q57 Are you familiar with the allegations that Mr. Gallagher has made?

A57 Yes.

Q58 Have you read his affidavit?

A58 Yes.

Q59 Let me ask you first, Mr. Pope, about Mr. Gallagher's allegations concerning his firing in 1979. When was Mr. Gallagher fired?

A59 On Junel, 1979.

Q60 On the day that Mr. Gallagher was fired, was the Ross plant going to be run?

A60 Yes. Mr. Gallagher had been told to run it.

Q61 At that time what was the status of the Ross plant?

A61 The Ross plant was being run as a backup to the Erie-Strayer plant. It was not being run regularly.

Q62 Mr. Gallagher states on page 2 of his affidavit that he was asked to mix concrete to be used at the cooling towers. Were the cooling towers Category II structures?

A62 Yes.

Q63 Why do you believe that Mr. Gallagher believed he had to check the box on the batch ticket which said the concrete was to be used for a "safety-related" placement and then sign the ticket?

A63 If the contractor, such as Ekocel, filled out the pour slip and checked the "safety-related" box on the pour slip, then the batch plant operator would have to check the same box on the batch ticket and sign it. This would be the case even if the use really were not Category I.

Q64 Mr. Gallagher says that he refused to batch concrete out of the Ross plant because he knew that it would not be usable. If concrete were not usable, what would happen to that concrete at the placement site?

A64 If something were wrong with the concrete such as the iceballs Gallagher discusses, it would be rejected.

Q65 What is your understanding of the reason Mr. Gallagher was fired?

A65 My understanding is that Blount Brothers told him to run the Ross plant and he refused to run it and the company fired him.

Q66 Do you believe that at that time Mr. Gallagher would have preferred to work at the Erie-Strayer plant?

A66 I believe so. As I said earlier, the Erie-Strayer plant was much cleaner and quieter than the Ross plant.

Q67 Was Mr Gallagher a member of the same union that you are a member of?

A67 Yes.

Q68 Generally, what are the grounds for filing a grievance with the union?

A68 A grievance is filed if a union member feels that the company fired him for no valid reason. If a worker believes that the company is asking him to do something that is not safe, that is grounds for filing a grievance. If Mr. Gallagher believed that he was fired because he refused to mix concrete that he thought would be dangerous, that would be grounds for him to file a grievance with the union.

Q69 Was the Ross plant run at all on the first work day after Mr. Gallagher was fired?

A69 I have been informed by Blount Brothers' office staff at Byron that there are no batch tickets for the Ross plant for June 4, 1979, which was the first work day after Mr. Gallagher was fired. This would indicate that no concrete was mixed at Ross on that day. I personally did not work at the Ross plant on that day, or on any day near that date.

Q70 Have you had any personal contact with Mr. Gallagher since the date he was fired?

A70 Yes, he and I maintained contact until he came out with his affidavit. Until that point, Mr. Gallgher would call me when he needed advice on operating a batch plant.

Q71 Let me direct your attention to the middle paragraph on page 3 of Mr. Gallagher's affidavit. Are you aware of any instance in which Mr. Sorensen reprimanded Blount Brothers people for failure to meet Edison's desired production levels?

A71 No.

Q72 Are you aware of any instance in which Edison construction supervisors visited Blount to complain that concrete quotas were not being met?

A72 No. If such complaints were made I would have been one of the first to hear about them.

Q73 Do you believe that Blount Brothers was under tremendous pressure from Edison to increase the pace of its concrete production?

A73 No.

Q74 Let me turn your attention, Mr. Pope, to the bottom of Page 3 and the top of Page 4 of the affidavit, where Mr. Gallagher talks about aggregate.

Do you recall being with Mr. Gallagher in November of 1975 when he says that the two of you looked at the aggregate pile outside of the batch plants?

A74 Yes.

Q75 What happened at that time?

A75 I stated that I thought that there seemed to be too many fines in the pile.

Q76 Did you do anything after you made that observation?

A76 Yes, I went to Blount quality assurance and told them that I wanted to see the results of the next cylinder test. In addition to the testing of aggregate itself, the cylinder test is another way of making sure the aggregate is good. The way in which the concrete breaks indicates whether the aggregate has too many fines in it -- when it breaks through the rock instead of around it, it's a good break, to my estimate. I got the test results and everything looked good, so I quit worrying about it.

Q77 Did you actually look at the break that was performed?

A77 Yes.

Q78 Mr. Pope, do you believe that as of November, 1975 Mr. Gallagher was experienced enough to recognize good aggregate from bad aggregate?

A78 No.

Q79 On Page 4 of his affidavit Mr. Gallagher refers to an Israeli engineer who visited the Byron site. Did you ever meet with this Israeli engineer?

A79 Yes.

Q80 Why was he at the site?

A80 To look at the computerized batch plant, the Erie-Strayer plant.

Q81 Did the engineer ever mention to you that he thought the quality of the aggregate was not adequate?

A81 No.

Q82 On Page 4 of his affidavit Mr. Gallagher discusses that the NRC or other inspectors condemned the aggregate pile in 1978. Do you recall any such condemnation of the aggregate?

A82 I recall that in either 1978 or 1979 aggregate at the Byron site was condemned.

Q83 Do you recall the reason that the aggregate was condemned?

A83 Equipment traffic, such as front-end loaders, had been running on a part of the aggregate pile in order to reach other parts of the pile. Part of the pile had become a ramp to the rest of the pile. This made the part that the traffic was driving on dirty and caused it to fail the test which measured the percentage of fines in the aggregate, so it had to be rewashed.

Q84 To your knowledge, was the condemned aggregate subsequently rewashed?

A84 Yes.

Q85 If you look at Mr. Gallagher's affidavit near the bottom of Page 4, Mr. Pope, you'll note that Mr. Gallagher alleges that aggregate which had not met specifications was used to mix the concrete for the Unit 1 containment and turbine building. Do you agree with that statement?

A85 No, I don't agree with it.

Q86 On what basis do you not agree with the statement?

A86 With the testing laboratory testing the aggregate every day, bad aggregate would have been detected and rejected, and I would have heard about it.

Q87 Are you aware of any placed concrete that was composed of aggregate that had failed any of the tests performed on it?

A87 No.

Q88 Mr. Pope, let me turn to the issue of maintenance of the batch plants. Who was responsible for maintenance of the batch plants?

A88 The batch plant operators were.

Q89 Please describe the type of maintenance performed?

A89 In general, the batch plant operator would visually check [illegible]s and gearboxes for grease levels, making sure all the surfaces were greased and that the rollers had no buildup on them. The operator made sure the mixer at the Erie-Strayer plant was clean, and made sure the configuration wasn't worn. The scales, the admixtures, and the dispensers at both plants, and the water meter at the Erie-Strayer plant, were all calibrated every 90 days.

Q90 Was the equipment maintenance performed regularly?

A90 Yes.

Q91 We'll move on to the next subject in Mr. Gallagher's affidavit. Were you allowed to talk to NRC engineers when they would come to visit the batch plant?

A91 I was allowed to talk to anybody.

Q92 Was it your understanding Mr. Gallagher also could talk to anybody?

A92 I never heard anybody tell him he couldn't talk to anybody.

Q93 Mr. Gallagher says, on Page 6 of his affidavit, "I think that Blount supervisors, anxious to meet Edison's daily demand quotas, did not feel strict adherence to quality control procedures was necessary, and thought that strict adherence would interfere with the speed at which concrete was produced." In your opinion, Mr. Pope, was strict adherence to quality control procedures followed?

A93 Yes.

Q94 I now want to turn to Mr. Gallagher's allegations regarding the addition of water to concrete. Is water one of the ingredients of concrete?

A94 Yes. Without water the concrete would not be workable.

Q95 Were there specifications which set forth the amount of water that was to be added to a batch of concrete?

A95 Yes. The specifications were established by the architect-engineer. The architect-engineer determined the mix design for the particular concrete to be batched. The mix design included the required water-cement ratio and set forth the maximum number of gallons of water that could be added to the mix.

The batch ticket then showed how many gallons of water had been added to the mix at the batch plant, under the heading "water trim," and workers in the field were allowed to add gallons up to the maximum allowed by the

mix design. The workers could not add any more water than was allowed by the numbers set forth on the batch ticket.

The slump test made sure that the actual concrete batched did not have too much water in it. If a batch had too much slump but was within the water-cement ratio the batch would be rejected. In addition, if a batch of concrete exceeded the water-cement ratio but passed the slump test the batch would be rejected.

Q96 Why would a batch of concrete fail a slump test if the water in the mix were within the appropriate water-cement ratio?

A96 The mix design established by the architect-engineer provided the guidelines for the batching of concrete, but, of course, conditions in the field, at the batch plant, were not ideal. So, if part of a pile of aggregate was drier than another part of the pile, or if the temperature of the cement was warmer in one batch than another, the moisture characteristics of concrete batches would vary. This is why the actual number of gallons of water that had to be added to a batch to bring the concrete within the right slump might be different for two batches, and the number of gallons of water that could be added at the placement site would also be different. And this is why a batch could fail a slump test by being too wet even though the number of gallons added to the mix was within the amount allowed by the mix design.

Q97 How would you know the mix design that you were to use for a particular batch of concrete?

A97 The pour slips I received at the batch plant, like Exhibit 3, indicated the type of mix I was to batch. On Exhibit 3 the mix is M-55-10, and this mix had a particular water-cement ratio.

Q98 Were you informed if concrete failed a slump test or if too many gallons of water had to be added to the mix in order to bring it within the appropriate slump?

A98 Yes. The problem would be noted on the batch ticket. As I mentioned earlier, as a practical matter I would learn about the problem long before the batch tickets were returned to the batch plant, because personnel at the placement site would radio me and I would immediately make adjustments at the plant.

Q99 Mr. Gallagher's next topic in his affidavit, Mr. Pope, is oil in the concrete. Do you know Glenn Garrison?

A99 Yes.

Q100 Who is he?

A100 He was the pig operator, which means that his job was to maintain the storage bins for the cement. The bins were trucks which were equipped with blowers which would blow the cement from the bin into the silos of the plants.

Q101 Are you aware of the problem that Mr. Gallagher refers to of possible oil leakage in one of the blowers?

A101 Yes.

Q102 When did you hear about that problem?

A102 Glenn Garrison said that he was having trouble with a blower on a storage bin. He thought he was losing some oil. So, I went out with Mr. Garrison to look at the problem. Blount Brothers immediately took that blower off the line and sent it out and had it completely rebuilt. I do not remember the date when this occurred.

Q103 To your knowledge, did any oil get into the cement as a result of the problem?

A103 Mr. Garrison told me that he thought oil was getting into the cement. If enough oil had gotten into the concrete that we were batching the concrete would have been weakened, and would have failed the cylinder tests. I never was informed of any failure of cylinder tests, however, after the oil problem arose, so I conclude that if any oil did get into the concrete the amount was very small.

In preparation for this testimony I was informed by Vernon Williams, who is Blount Brothers' project manager at Byron, that he had called the company who owns the storage bin and asked if any oil could get into the cement as a result of the type of problem we had. Mr. Williams told me that he was informed by the company that it had never heard of oil actually getting into the cement as a result of the type of oil leak that we had. The company that originally owned the

storage bin was Butler Manufacturing, but I understand that the company is now owned by Penske Truck Company.

Q104 Have you spoken with Mr. Garrison recently about this problem?

A104 Yes. I spoke with him a couple of months ago, after Mr. Gallagher's allegations came out, and he said that the machine had been fixed right away, like I thought.

QA-QC WORK PROCEDURE NUMBER SIX

FOR

CONCRETE PRODUCTION AND TRANSPORTATION

BYRON STATION - UNITS 1 & 2

GENERAL STRUCTURES WORK- F-2722

PURCHASE ORDER 181186

OWNER

COMMONWEALTH EDISON COMPANY

Chicago, Illinois

CONTRACTOR

BLOUNT BROTHERS CORPORATION

Boston, Chicago, Houston, Montgomery, New York

SERIAL No.

BLOUNT

ISSUE TEN

REVISION NINE

April 9, 1979

DONALD POPE
EXHIBIT No. 1

CONCRETE PRODUCTION AND TRANSPORTATION

1. PURPOSE

1.1 This procedure provides for the controls of Category I concrete production and transportation to be used by Blount Brothers Corporation and the documentation thereof.

2. SCOPE

2.1 Included herein are the technical requirements which must be met for receiving and handling concrete materials, plant operation, the computer control system, and calibration, related thereto, and movement from the central mixer to the point of discharge for placement of Category I concrete in the project.

3. RESPONSIBILITY

3.1 Plant Superintendent

3.1.1 Reports to the Project Superintendent and is responsible for the complete plant operation including:

a. Ordering and receiving all materials (see e. below)
b. Scheduling and dispatch of deliveries
c. Production processes
d. Condition and maintenance of plant including truck mixers
e. Cement and Fly-Ash purchased by Commonwealth Edison Company must be supported by Suppliers' Certified Material Test Reports and/or Independent Testing Laboratory test reports.

3.2 Testing Agency and Concrete Consultant

3.2.1 Will provide services and documentation of same as defined in Specification F-2722 Division 3-6. (This is Commonwealth Edison Company's responsibility.)

3.3 QA/QC Inspection

3.3.1 Will cooperate with Testing Agency and Concrete Consult-

ant in order to verify that required tests and inspections are performed and results are acceptable. In the event that test results are unacceptable the procedure called for in Procedure Number Four, "Field Inspection," will be followed and the Plant Superintendent notified so that unacceptable materials or processes will be discontinued.

4. MATERIAL RECEIPT AND HANDLING

4.1 Aggregates

4.1.1 For receiving documentation refer to Procedure Number Ten.

4.1.2 Materials will be stored on the ground on a consolidated base of crusher run limestone, shaped and sloped to permit run off of excess moisture in the materials away from traffic and the plant.

4.1.3 Will be delivered from approved sources in rear dump trucks and deposited directly into segregated stock piles in such a manner that a truck load unit will remain in place or be rehandled by means of a rubber-tired front end loader and placed so that segregation does not occur.

4.1.4 Fine and coarse aggregates will not be permitted to intermix.

4.1.5 Materials will be taken from the stock piles with the front end loader mentioned in 4.1.3 and deposited in separate hoppers for automatic transfer to the bins. Care will be taken by the loader operator so that a thin layer of aggregate is left in place to insure against contamination with the ground. Material will be removed from the stockpiles so that running of material does not permit separation sufficient to effect gradation.

4.2 Cement and Fly-Ash

4.2.1 For receiving documentation refer to Procedure Number Ten.

4.2.2 Will be furnished from sources provided by Commonwealth Edison Company, F.O.B. plant site. Delivery is to be made in watertight and airtight bulk carriers equipped with integral pneumatic self-unloading equipment. Transfer will be made from the carrier with its own flexible lines to the connections on the plant or the ground storage units as required. Care will be exercised so that all connections to be made up at time of delivery are free of foreign matter and/or moisture.

4.2.3 Transfer from ground storage units to the plant silo will be by means of flexible line as in 4.2.2, above, employing the integral pneumatic pump on each storage unit.

4.2.4 All compressed air lines will be equipped with a filter-drier so that the air in use is moisture free.

5. ADMIXTURES

5.1 Air-Entraining

5.1.1 Air-entraining admixtures will be an approved product which conforms to ASTM C260-73, including "Optional Uniformity Requirements" in Section 5. Air-entraining admixtures containing more than one per cent chloride ions shall not be used. Each shipment will be accompanied with a CMTR that the admixture was tested in accordance with ASTM C-260-73 and include results of those tests outlined in S & L Specification F-2722.

5.1.2 For dispensing into the mixing concrete see paragraph 7.8 below.

5.2 Water-Reducing

5.2.1 In the event that the Consulting Engineers direct the use of a design mix including a water-reducing agent, the plant is equipped to dispense same as in 5.1.2 above.

5.2.2 Water-reducing admixtures shall conform to ASTM C494-71, Type A, water-reducing only subject to the specific

requirements set forth in S & L Specification F-2722. CMTR's will be supplied in accordance with provisions set forth in S & L Specification F-2722.

6. GENERAL

6.1 The QA/QC Material Controller will prepare Receiving and Inspection Reports as covered in Procedure Number Ten, "Receiving, Storage and Handling."

7. BATCHING AND MIXING

7.1 General

7.1.1 The plant is fully integrated and computer controlled for the production of batches of mixed concrete from 1 to 10 c.y. in increments of .10 c.y. Before operation begins it will carry Certification of Conformance with the requirements of the "Check List for Ready Mix Concrete Production Facilities" established by the National Ready Mixed Concrete Association.

7.1.2 The plant is comprised of the following elements which together provide for ease of erection and dismantling as well as portability.

a. Raw aggregate hoppers and bin charging conveyors
b. Aggregate bins, batcher and batch transfer conveyor
c. Cement silo and batcher
d. Tilting mixer
e. Ice crusher, feeder and batcher
f. Computer control system and trailer

7.2 Raw Aggregate Hoppers and Bin Charging Conveyor

7.2.1 As required, the equipment will handle one coarse aggregate and one fine aggregate separately via front end loader.

7.2.2 Each hopper holds up to 20 c.y. loose measure heaped.

7.2.3 Each hopper is equipped with an 18" x 12" air operated

discharge gate.

7.2.4 Coarse and fine aggregate conveyors are 24" x 100' capable of handling up to 300 tons per hour each.

7.2.5 At the start up of operation the hoppers are loaded and the loader operator will put the system into the "manual" operating position on the aggregate handling panel adjecent to the hoppers. Belts start, discharge gates open and filling of the aggregate bins commenses. When the high level indicator in the bins signals the "full light" at which time the operator puts the panel into the "automatic" operating position, closing the gates and emptying the belts. When the low level indicator in the bins is activated by removal of aggregates into the batchers a signal starts the conveyor and opens the gate transferring material to the bins until the bin activates the high level indicator which closes the gate and stops the conveyor when it is empty.

7.3 Aggregate Bins, Batcher and Batch Transfer Conveyor

7.3.1 The three compartment bin is elevated above the batching unit. The bin carrier CPMB registry No. 4849 and is certified for 72 c.y., the end compartments holding 23.5 c.y. and the center compartment 25.0 c.y.

7.3.1.1 Fine aggregates are discharged into the rear section (furthest from the mixer.) The coarse aggregates discharge into the center and front compartments. The partition between the center and rear compartment has a removable extension to insure that there is no inter-mixing if the compartments should become heaped.

7.3.1.2 Each compartment is equipped with a manually operated 1 C.F. sampling tray accessible from a platform with toe plates and handrails along one side of the bin.

7.3.1.3 The high and low level indicators mentioned in 7.2.5, above, are installed in the middle and rear compartments to signal for more of each aggregate or to turn off the supply automatically.

7.3.1.4 Each compartment is equipped with tandem 18" x 18" air operated charging gates to the compartmented batcher.

7.3.1.5 A moisture probe in the fine aggregate compartment transmits a percentage figure for moisture content to the control panel and is used for compensation of water batch calculations.

7.3.2 The three compartmented batcher carries CPMB registry No. 2446 and is certified and rated at 10 c.y. in terms of c.y. of concrete.

7.3.2.1 The batch weights for each material, according to the several mix designs, is stored in the computer control memory which automatically causes the charging gates to close when the weight called for has been transferred to the batcher, fines first, then coarse.

7.3.2.2 A cumulative dial scale is mounted on the separate support frame of the batcher. The dial chart is divided into 40 lb. divisions to 40,000 lbs. Digital read out is transmitted to the computer panel electrically.

7.3.2.3 Discharge to the transfer conveyor is by means of a three section, air operated gate individually activated via solenoids which permit "ribbon" deposit on the transfer conveyor at controlled rates.

7.3.3 The transfer conveyor is charged from the batcher gates so that there is some fine aggregate on the belt before

the coarse aggregate gate is opened so that a proportion of both aggregates is carried on the 48" belt at the same time for feed into the mixer charging chute.

7.3.4 The transfer conveyor is electronically interlocked with the mixer and the batcher gates so that it can not operate until the mixer is empty and in the charging position.

7.3.5 When crushed ice is used, it is deposited on the belt with the aggregates just before the materials enter the mixer charging chute.

7.4 Cement Silo and Batcher

7.4.1 The cement silo carrier CPMB registry No. 1-855 and is certified to have a capacity of 2703 C.F.

7.4.1.1 It is divided in two by a double wall partition.

7.4.1.2 The 1802 c.f. compartment is for the Portland cement type II and the 901 c.f. compartment is for Flyash or Portland cement type I.

7.4.1.3 Each compartment is equipped with a safety valve against over pressurization and filter vents with blowers and shakers for dust control to the atmosphere.

7.4.1.4 Two 5" pipe loading lines serve the 1802 c.f. compartment and a third one serves the 901 c.f. compartment. They have quick connectors for hook up to the delivery lines and have caps when not connected. Load lines are identified by sign designating type of cement or flyash to be carried by each line. 9

7.4.1.5 Each compartment is equipped with high and low level bin signals to the control trailer.

7.4.1.6 Each compartment is equipped with solenoid valve controlled, air pad aeration systems, manholes and covers.

7.4.2 The cement batcher is located below the silo and carries CPMB registry No. 2446 and is certified and rated at 10 c.y. in terms of c.y. of concrete.

7.4.2.1 A cumulative dial scale is mounted next to the aggregate dial mentioned in 7.3.2.2, above. The dial is divided into 8 lb. divisions to 8,000 lbs. Digital read out is transmitted to the computer panel electrically.

7.4.2.2 Batch weights of cement and fly-ash are regulated as in 7.3.2.1, above, cement first, then fly-ash.

7.4.2.3 The batcher is charged via 2-9" air operated valves and safety gates.

7.4.2.4 Discharge to the cement chute to the mixer (separate from the aggregate chute) is via a 14" air operated valve, solenoid controlled as in 7.3.2.3, above, so that proportionate feed of cement and fly-ash is continuous with the charging of the aggregates.

7.4.2.5 The batcher is equipped with aeration, venting and dust collecting equipment as for the silo.

7.4.2.6 Interlock protection of discharge is as in 7.3.4, above.

7.5 Tilting Mixer

7.5.1 The mixer carries PMMD division of CPMB registry No. J-2-184 and is certified to produce 10 c.y. in normal working position with slumps between 1-½" and 3" and maximum aggregate size of 3" at 10.75 revolutions per minute.

7.5.2 The manufacturer's experience indicates the following time cycles to produce uniform concrete for 10 c.y. batch:

1.	Charge all ingredients	22 seconds
2.	Mix	60 seconds
3.	Tilt and discharge (Variable)	30-40 seconds
4.	Return to mix position	8 seconds

5. Delay (Start Charge) 1 second

TOTAL CYCLE 121 to 131 seconds *
or 274 to 297 c.y. per hr.

* Mixing time may be reduced if samples taken after discharge of approximately 15 per cent and 85 per cent of the load do not differ by more than those values listed in Table X1 of ASTM C94 for the various properties listed in Table X1.

9

7.5.2.1 All functions of the mixer are protected by interlocks so that no material can be introduced into the drum after it has been charged until it has been emptied and returned to the normal position.

7.5.2.2 Ordinarily the operator will manually control tilting and discharge into the truck mixers. The discharge rate can be controlled manually, brought to a stop and continued, or returned to the normal position as desired and discharge re-started.

7.5.2.3 Charging of materials is automatically sequenced so that some of the water batch is introduced first, is then continued while the aggregates, cement and fly-ash are introduced simultaneously. (For introduction of admixtures see paragraph 7.8, below.)

7.6 Ice Crusher, Feeder and Batcher

7.6.1 When required, block ice up to 500 lb. per unit, is fed into an elevating screw conveyor to a 10 c.y. capacity holding hopper which is positioned over the transfer conveyor, see paragraph 7.3.5, above.

7.6.2 The required crushed ice called for by the design mix is fed from the holding hopper via a hydraulic drive screw conveyor to the batcher below. A dial scale, mounted

with the other scales, as in 7.3.2.2, above, measures the required amount to the batcher. The dial chart is divided into 4 lb. divisions to 4000 lbs. Digital read out is transmitted to the computer panel electrically. The batcher is emptied to the charging conveyor, see paragraph 7.3.5, above.

7.7 Water System

7.7.1 Water is supplied from the plant well at rates up to 800 gallons per minute and is pumped to a holding tank ahead of the water heating boilers when heated water is required or directly to the 4500 gallon storage tank in the base of the mixer support. The storage tank is filled on demand as signalled by a 3" float valve.

7.7.2 A 7½ H.P. transfer pump supplies a 480 gallon capacity batch tank under the cement silo. The pump is activated when an "empty" probe calls for a new batch.

7.7.3 The design mix batch volume of water is discharged to the batch tank by an air operated valve through a 3" automatic meter with impulse contactor and totalizing register mounted adjacent to the mixer charging chute. Each pulse registers one gallon. Digital read out is transmitted to the computer panel electrically.

7.7.4 The transfer pump is interlocked so that when water is being discharged to the mixer, as in 7.5.2.3, above, water cannot be put into the batch tank while it is emptying.

7.7.5 The moisture content of the aggregates are programmed into the console by the operator. The console then automatically calculates the amounts of water to deduct and aggregate to add to the theoretical design mix quantities. Any further deduction of water is controlled by the operator and is indicated as gal/c.y. trimmed on the ticket printout. The Testing Agency is responsible for deter-

mining the moisture content of the aggregates.

7.8 Dispensing of Admixtures

7.8.1 Admixtures are transferred by pump from the suppliers' containers to storage vessels at the batch plant. The design mix quantity is measured by the impulse pump which measures one ounce per pulse. Digital read out is transmitted to the computer panel electrically.

7.8.2 The design mix water quantity is reduced by the amount of liquid admixture called for so that the cumulative total liquid is provided per batch.

7.8.3 Air entraining admixture will be introduced in the sand as it is being fed to the transfer conveyor. Water reducing admixture will be introduced at the water fill nozzle.

7.9 Control System

7.9.1 The hub of the system is a solid state electronic computer with a 16,000 word core memory and includes:

a. Teletypewriter
b. Flexible disk and drive
c. Video monitor
d. Manual control panel
e. Power control panel

7.9.2 Computer

7.9.2.1 Programmed for automatic batching of:

a. Up to 4 aggregates
b. 2 cements
c. Water
d. Ice
e. Up to 3 admixtures

7.9.2.2 Features include:

a. Batcher weighing interlocks
b. Central start
c. Batch complete

d. Central discharge
e. Predictive weighing and pre-set tolerance cutoff
f. Moisture compensation
g. Formula selection
h. Batch size selection from 1 to 10 c.y. in 0.1 c.y. increments
i. Controlled discharge for sequencing and discharging to mixer feed.

7.9.3 Teletypewriter

7.9.3.1 Enters information to computer memory

7.9.3.2 Calls up information from memory

7.9.3.3 Batching information for ticket print out including:

a. Destination of load
b. Month, day and year
c. Design mix code
d. Load size
e. Weight of coarse aggregate
f. Weight of fine aggregate
g. Moisture content of aggregates
h. Weight of cement/fly-ash
i. Weight and volume of water added
j. Weight of ice
k. Volume of admixtures
l. Volume of water trimmed
m. Yards ordered
n. Cumulative yards delivered
o. Tare zero
p. Tare balance
q. Time of discharge
r. Truck number

7.9.3.4 Daily, shift or weekly cumulative totals of

weights of aggregates and cement used.

7.9.4 Disk Drive

7.9.4.1 Mass storage of input information

7.9.5 Video Monitor

7.9.5.1 Displays on T.V. tube information commanded by teletypewriter and flashes areas of error or need for manual input such as truck numbers.

7.9.6 Manual Control Panel

7.9.6.1 Provides digital read outs for:

a. Aggregates
b. Cement
c. Ice
d. Water
e. Admixtures

7.9.6.2 Manual feed switches and feed lights for all operations.

7.9.6.3 Water batch tank and admixture bottle empty lights.

7.9.6.4 Discharge open and closed switches and indicating lights.

7.9.6.5 Aggregate and cement vibrator switches.

7.9.6.6 Motor load adjuster and meter.

7.9.6.7 Water and admix selector switch.

7.9.6.8 Moisture indication meter.

7.9.6.9 Mixer tilt, hold and return control.

7.9.7 Power Control Panel

7.9.7.1 Key operated:

a. Power On-Off switch
b. Tolerance acceptance switch
c. Start-Stop switches for:
   1. Batch transfer conveyor
   2. Mixer drive motor
   3. Mixer hydraulic drive
   4. Aeration blower

5. Compressor
6. Filter vent blower
7. Filter vent shaker
8. Batcher vent shakers

7.9.7.2 Running lights for all items in 7.9.7.1 and aggregate and cement high and low level indicators.

7.9.8 The automatic control system carries CPMB registry No. 1874 and the recorder carries CPMB registry No. 1406.

7.10 Control Trailer

7.10.1 Heated and air conditioned electrically houses all controls mentioned in subsection 7.9, above and the admixture dispensing system.

7.11 Local Control Panels

7.11.1 Auxiliary control panels are provided at the raw aggregate hoppers as mentioned in paragraph 7.2.5, above, for optional local control of initial feed.

7.11.2 A similar panel is located at the ice crusher for optional local control of initial feed.

7.12 Calibration

7.12.1 Initial calibration must be made for the scale dials that weigh out the aggregate, cement, fly-ash and ice batcher.

7.12.1.1 This will be performed before the start of production by the manufacturer or a licensed agency of the state.

7.12.1.2 Calibration will be in accordance with the requirements of the N.R.M.C.A. for the full range of use for each dial and the digital recorder. A certified certificate of calibration will be issued by the testing agency.

7.12.1.3 Accuracy within plus or minus 0.20 per cent throughout the range of use will be obtained and sealed accordingly.

7.12.1.4 Up to 12,000 lbs. of test weights, each accurate within plus or minus 0.01 per cent of indicated value will be used. The "Build-Up" method will be used above that amount for the full range of the larger dials.

7.12.1.5 Scales will be rechecked at least every 90 days thereafter.

7.12.2 Water or other liquid measure meters will be verified in accordance with approved written procedures.

7.12.3 All plant instrumentation that may require re-calibration will be calibrated by the applicable manufacturer's authorized representative and the results documented.

8. TRANSPORTATION

8.1 Truck Mounted Mixers

8.1.1 The mixers are new C.M.C. model DDUK series, hydraulic drive, chainless.

8.1.2 All units are certified by the TMMB section of NRMCA to comply with their standards and carry their rating plate with registry number related to the manufacturers date plate on each unit.

8.1.3 The empty volume of each mixer is 450 c.f., agitating and mixing capacities are 10 c.y. Only 60% of the gross volume is used for in transit mixing or agitation versus the permissible 63% and 80% respectively.

8.1.4 Each mixer is equipped with a cumulative revolution counter and hydraulic operating controls at the discharge end and in the cab.

8.1.5 Each mixer is certified for speeds between 2 and 6 r.p.m. for in transit agitation and 6 to 18 r.p.m. for charging and discharging. Discharge speed will obviously be governed by the rate at which placing equipment can take the mix. It is recommended initially to rotate the drum

8.1.6 Truck mixers are equipped with 100 gallon side mounted pressure water tarks with site glass gauges, factory calibrated.

8.1.7 A hose connection from the tank to the rear of the mixer is equipped with a variable pressure nozzle for internal drum washing and cleaning down of chutes and running gear before return for a new batch.

9. ORDERING AND TICKETING

9.1 Orders will be placed in writing using the "Concrete Order Form," exhibit shown on page 18. All appropriate spaces are to be filled in as required or the initials NA (not applicable) inserted so that all spaces are accounted for.

9.1.1 The order form is in quadruplicate, self carbon.

9.1.2 The white original and the blue copy must be in the hands of the Plant Superintendent in ample time, to be determined by the Project Manager, so that the plant has appropriate advance notice of job needs.

9.1.3 The originator, authorized parties will be named by the Project Manager, will retain the green copy and forward the yellow copy to the QA/QC Manager at the time the order is placed with the plant.

9.1.4 The QA/QC Manager will retain the yellow copy until the Plant Superintendent completes his portion of the form and forwards the blue copy to the QA/QC Manager. The yellow copy can then be discarded and replaced by the blue copy to complete the QA/QC file.

9.2 Teletypewriter print out tickets are letter size with four carbons, per the exhibit on page 19.

9.2.1 Each ticket will be signed and an "X" placed in the box provided to indicate appropriately if the load is "Safety Related."

9.2.2 The original and first three copies will be given to the

driver who will give all copies to the Testing Laboratory Inspector at the point of delivery. 9

9.2.3 The Testing Laboratory Inspector will enter the time the batch was emptied, and sign for receipt in the space provided, the original will be returned to the plant by the driver. Should the addition of water to the load be required, the BBC QA/QC Inspector shall be notified. At that time, the BBC QA/QC Inspector shall monitor the water addition and document the amount added on the batch ticket. 9

9.2.4 The first copy may be retained by the QA/QC Inspector who can accumulate the day's tickets and turn them into his superior who will in turn route them to the Project Engineer for his use and ultimate turn over to the Job Accountant, if necessary. 9

9.2.5 The Testing Laboratory Inspector will retain the third copy for his use. 9

9.2.6 The QA/QC Inspector will retain the second copy in order to complete the BBC QA/QC file. 9

9.2.7 Should any concrete be suspect, the Testing Laboratory Inspector will place the load on hold and notify the BBC QA/QC Inspector. The disposition of the load shall then be decided and documented by the QA/QC Inspector. 9

9.2.8 If for any reason a load or part load is not placed, either being rejected or excess to requirements, the QA/QC Inspector will explain fully in the space provided on his copy. 9

BLOUNT BROTHERS CORPORATION

New York Chicago Boston Houston

Montgomery, Ala.

10580

DELIVER TO:

LOCATION OF PLACEMENT:

BYRON STATION – UNITS 1 & 2
OWNER
Commonwealth Edison Company
Chicago, Illinois

PRESS FIRMLY YOU ARE MAKING 5 COPIES

MONTH DAY YEAR	CONSECUTIVE BATCH NO.	DESIGN MIX CODE NO.	% MOISTURE		CU. YDS. THIS LOAD	CUBIC YARDS ORDERED	CUBIC YARDS DELIVERED INCLUDES THIS LOAD	TRUCK NO.	

BATCH DATA

CHECK, IF SAFETY RELATED CONCRETE ☐

X _____
BATCH PLANT OPERATOR'S SIGNATURE

IF REJECTED GIVE REASONS AND DISPOSITION OF LOAD

_____

_____

_____

TIME EMPTIED _____ A.M. P.M.

RECEIVED BY:

X _____
AUTHORIZED SIGNATURE B.B. CORP. FOREMAN

MATERIAL SYMBOLS

AG1 = 57 STONE
AG2 = 67 STONE
AG3 = 467 STONE
AG4 = SAND

CM1 = CEMENT, TYPE I
CM2 = CEMENT II
AD1 = AIR ENT.
AD2 = WATER RED.
WTR = WATER
ICE = ICE

WATER ADDED _____ GALS.

SLUMP _____ IN.

AIR CONTENT _____ %

TEMPERATURE _____ °F.

X _____
AUTHORIZED SIGNATURE, TESTING AGENT

BLOUNT BROTHERS CORPORATION

Montgomery, Alabama
36102

BLOUNT BROTHERS CORPORATION

CONCRETE ORDER

BYRON STATION, ILLINOIS

Date _____

Pour Location _____

Date of Pour _____ Start Time _____

Quantity _____ Type/Mix _____

Grout _____ Rate per Hr. _____

Special Instructions _____

Heated ☐ Yes ☐ No _____

Cooling ☐ Yes ☐ No _____

Safety Related ☐ Yes ☐ No _____

Temperature Required _____

Authorized Sign. _____ Q.A. _____

Rec'd by Plant _____ A.M. / P.M.
Date

By: _____

Actual/Time Started _____ / Yds. Shipped _____

Remarks _____

RL-22-B

PREPARED	APPROVED	REVISED	TITLE	ORIG. DATE	REV. DATE	PAGE
F. N.	DW	RD	CONCRETE PRODUCTION	9/17/75	4-9-79	18

RL-10-B

Rev. 9

QA-QC WORK PROCEDURE NUMBER SIXTEEN

FOR

BYRON STATION - UNITS 1 & 2

GENERAL STRUCTURES WORK - P-2722

PURCHASE ORDER 181186

OWNER

COMMONWEALTH EDISON COMPANY

Chicago, Illinois

CONTRACTOR

BLOUNT BROTHERS CORPORATION

Boston, Chicago, Houston, Montgomery, New York

SERIAL No. QC- _____

ISSUE THREE

REVISION TWO

BLOUNT

April 20, 1981

DONALD POPE

EXHIBIT No. 2

BATCHING TRUCK-MIXED CONCRETE

1. PURPOSE

1.1 The purpose of this procedure is to insure that truck-mixed concrete is batched and delivered in accordance with ASTM C94-74, "Standard Specification for Ready-Mixed Concrete".

2. SCOPE

2.1 This procedure is applicable to the batching and transportation of Category I concrete.

3. RESPONSIBILITY

3.1 Batch Plant Superintendent

3.1.1 Reports to the Project Superintendent and is responsible for complete plant operation including:

a. Ordering and receiving all materials.

b. Scheduling and dispatching deliveries.

c. Production processes.

d. Condition and maintenance of plant including truck mixers.

3.2 QA/QC Inspectors

3.2.1 Will cooperate with Testing Agency in order to verify that required tests and inspections are performed and results are acceptable.

3.2.2 Perform and/or supervise all calibration checks on measuring devices in accordance with Blount Brothers Corporation Procedure Number Seven, "Calibration".

3.3 Testing Agency

3.3.1 Responsible for testing and documentation as defined in Sargent and Lundy Specification F-2722, Division 3-6.

4. MEASURING MATERIALS

4.1 Cement

4.1.1 Cement shall be measured by weight within ± 1 percent of the required weight.

4.2 Aggregates

4.2.1 Aggregates shall be measured by weight. Batch weights shall be based on dry materials and shall be the required weights of dry materials plus the total weight of moisture (both absorbed and surface) contained in the aggregate.

4.2.2 The aggregates are to be weighed in a cumulative weigh batcher and the cumulative weight after each successive weighing shall be within ± 1 percent of the required cumulative amount when the scale capacity, the tolerance shall be ± 0.3 percent of scale capacity or ± 3 percent of the required cumulative weight, whichever is less.

4.3 Mixing Water

4.3.1 Mixing water shall consist of water added to the batch, ice added to the batch, water occurring as surface moisture on the aggregates and water introduced in the form of admixtures.

4.3.2 Added water shall be measured by volume to an accuracy of ± 1.0 percent of the desired amount. 2

4.3.3 Ice shall be measured by weight to an accuracy of ± 1 percent of the desired amount.

4.4 Admixtures

4.4.1 Admixtures shall be measured by volume to an accuracy of ± 3 percent.

5. MIXING AND DELIVERY

5.1 After all materials are charged into the truck mixer they shall be mixed from 70 to 100 revolutions at the mixing speed recommended by the mixer manufacturer.

5.2 Concrete uniformity tests are to be made in order to assure the concrete properties are within the limits established in Appendix XI of ASTM C94-74.

6. CALIBRATION OF MEASURING DEVICES

6.1 Scales for weighing materials shall conform to the applicable sections of the current edition of the National Bureau of Standards, "Handbook #44".

6.2 Scales will be checked initially and every 90 days by a licensed agency of the state.

6.3 The water meter will be checked every 90 days in accordance with written procedures.

6.4 Admixture dispensers will be checked every 90 days in accordance with written procedures.

7. GENERAL

7.1 Ordering of concrete will be as specified in Blount Brothers Corporation QA/QC Procedure Number Six for "Concrete Production and Transportation".

7.2 A ticket shall be handwritten for each truck unit of concrete batched.

7.2.1 The ticket shall indicate as a minimum the following:

a. Placement location.

b. Date.

c. Time of day.

d. Concrete Quantity Batched.

e. Batched Weights of Aggregates.

f. Batched Weight of Cement.

g. Batched Volume of Mixing Water.

h. Batched Weight of Ice.

i. Batched Volume of Admixtures.

BLOUNT BROTHERS CORPORATION

CONCRETE ORDER

BYRON STATION, ILLINOIS

1-A-428-3-1-5

Date 4-3-79

Pour Location Interior wall & slab Cont. #1

Date of Pour 4-3-79 Start Time 8 AM

Quantity 15 c.y. Type/Mix M-55-10

Grout 1 c.y. Rate per Hr. 7

Special Instructions 2 trucks to pump south west side of cont #1

Heated [✓] Yes [ ] No

Cooling [ ] Yes [✓] No

Safety Related [✓] Yes [ ] No

Temperature Required 50°-80°

Authorized Sign. [signature] Q.A. R. Welch

Rec'd by Plant _____ Date _____ A.M. P.M.

By: _____

Actual/Time Started _____ / Yds. Shipped 22

Remarks 1 yd Grout

DONALD POPE
EXHIBIT No. 3

RL-22-B

BLOUNT BROTHERS CORPORATION

72280

New York Chicago Boston Houston

Montgomery, Ala.

DELIVER TO:
201 146464645
BLOUNT BROTHERS CORP.
BYRON STATION

BYRON STATION – UNITS 1 & 2
OWNER
Commonwealth Edison Company
Chicago, Illinois

LOCATION OF PLACEMENT:
383 05510
1-A-428-3-1-S INTERIOR WALL
& SLAB CONT #1/PUMP SOUTH
WEST SIDE CONT #1

PRESS FIRMLY YOU ARE MAKING 5 COPIES

MONTH DAY YEAR	CONSECUTIVE BATCH NO.	DESIGN MIX CODE NO.		WATER TRIM GALS/CU. YD.	CU. YDS. THIS LOAD	CUBIC YARDS ORDERED	CUBIC YARDS DELIVERED INCLUDES THIS LOAD	TRUCK NO.	
04/03/79	02284	4550		+00.51	0.00	215.00	0210.00	047	

BATCH DATA 72279 1

AG1 09200(01.60%)
AG2 18520(01.62%)
AG3 31[illegible]03.20%)
<01.20/01.00>
CM2 6944
<00.75/01.00>
AD1 049
WTR 239/1991

AGG TARE 0000 0000
CMT TARE 0000 0000
TIME: 0922

CHECK IF SAFETY RELATED CONCRETE ☑

5.2% 0.6

X _____
BATCH PLANT OPERATOR'S SIGNATURE

COMMENTS (IF REJECTED GIVE REASONS AND DISPOSITION OF LOAD)

TIME EMPTIED 9:40 A.M. P.M.

RECEIVED BY:

X _____
AUTHORIZED SIGNATURE

MATERIAL SYMBOLS

AG1 = COARSE AGGREGRATE
AG2 = COARSE AGGREGRATE (TOTAL)
AG3 = FINE AGGREGRATE + AG2

CM1 = CEMENT, TYPE II
CM2 = FLY ASH
AD1 = AIR ENT.
AD2 = WATER RED.
WTR = WATER
ICE = ICE

72280
WATER ADDED 5 GALS. 8.00

SLUMP _____ IN. 3.02

AIR CONTENT _____ %

TEMPERATURE _____ °F.

X _____
AUTHORIZED SIGNATURE, TESTING AGENT

DONALD POPE
EXHIBIT No. 4

INSPECTOR COPY

KIM Ready Mix INC. ERIE, PA.

BLOUNT BROTHERS CORPORATION

11078

New York Chicago Boston Houston

Montgomery, Ala.

DELIVER TO:
201
BLOUNT BROS. CONST.

LOCATION OF PLACEMENT:
289 .261.
1-A-302-B-2-716
REACTOR CORE

BYRON STATION – UNITS 1 & 2
OWNER
Commonwealth Edison Company
Chicago, Illinois

Eric Strayer

PRESS FIRMLY YOU ARE MAKING 5 COPIES

MONTH DAY YEAR	CONSECUTIVE BATCH NO.	DESIGN MIX CODE NO	% MOISTURE		CU. YDS. THIS LOAD	CUBIC YARDS ORDERED	CUBIC YARDS DELIVERED INCLUDES THIS LOAD	TRUCK NO.	
2/25/76	7821	2612		-21.34	12.28	2[illegible]	12.28	42	

BATCH DATA

A1 [illegible]
A2 [illegible]
A3 [illegible]
[illegible]
C1 [illegible]
[illegible]
D1 836
W 855/2124

AG TARE 0820 0836
CT TARE 0820 0828
TIME 0829

CHECK, IF SAFETY RELATED CONCRETE ☒

X [illegible]
BATCH PLANT OPERATOR'S SIGNATURE

IF REJECTED GIVE REASONS AND DISPOSITION OF LOAD

REJECTED DUE TO 98° TEMP. — PLACED AS ENCASEMENT FOR TELEPHONE DUCT RUN L.A. 2-6-76

THIS LOAD NOT PLACED

TIME EMPTIED 9:00 A.M. P.M.

RECEIVED BY:

X [illegible]
AUTHORIZED SIGNATURE B.B. CORP. FOREMAN

MATERIAL SYMBOLS

AG1 = 57 STONE
AG2 = 67 STONE
AG3 = 467 STONE
AG4 = SAND

CM1 = CEMENT, TYPE II
CM2 = FLY ASH
AD1 = AIR ENT.
AD2 = WATER RED.
WTR = WATER
ICE = ICE

WATER ADDED 0 GALS.

SLUMP — IN.

AIR CONTENT — %

TEMPERATURE 92 °F.

X KBCox (REJECTED LOAD)
AUTHORIZED SIGNATURE, TESTING AGENT

DONALD POPE
EXHIBIT NO. 5

BLOUNT BROTHERS CORPORATION

70438

New York Chicago Boston Houston

Montgomery, Ala.

BYRON STATION – UNITS 1 & 2
OWNER
Commonwealth Edison Company
Chicago, Illinois

DELIVER TO:
BBC

LOCATION OF PLACEMENT:
CONST. OPENING A 2

PRESS FIRMLY YOU ARE MAKING 5 COPIES

MONTH DAY YEAR	CONSECUTIVE BATCH NO.	DESIGN MIX CODE NO.		WATER TRIM GALS/CU. YD.	CU. YDS. THIS LOAD	CUBIC YARDS ORDERED	CUBIC YARDS DELIVERED INCLUDES THIS LOAD	TRUCK NO.
6-19-81	2	559		-2	6	60	6	68

BATCH DATA

AG-1 – 10920
AG-3 – 18420
CMT – 4800
Type II
ADM – 14 OZ
WTR – 96

CHECK, IF SAFETY RELATED CONCRETE ☒

X D.P.
BATCH PLANT OPERATOR'S SIGNATURE

COMMENTS (IF REJECTED GIVE REASONS AND DISPOSITION OF LOAD)
[illegible]
[illegible]
[illegible]

TIME EMPTIED 9:45 A.M. / P.M.

RECEIVED BY:
X [signature]
AUTHORIZED SIGNATURE

MATERIAL SYMBOLS

AG1 = COARSE AGGREGRATE
AG2 = COARSE AGGREGRATE (TOTAL)
AG3 = FINE AGGREGRATE + AG2

CM1 = CEMENT, TYPE II
CM2 = FLY ASH
AD1 = AIR ENT.
AD2 = WATER RED.
WTR = WATER
ICE = ICE

WATER ADDED 42 GALS.

SLUMP 1½" IN.

AIR CONTENT ______ %

TEMPERATURE ______ °F.

X [signature]
AUTHORIZED SIGNATURE, TESTING AGENT

DONALD POPE
EXHIBIT No. 6