Attachment 1

Byron Station
Environmental Protection Plan
1984 Annual Environmental Operating Report

Section 4.2 Environmental Monitoring

Section 4.2.1 Aerial Remote Sensing

The aerial photographic monitoring program was done two times in 1984. This was done to compare the results of photographs taken in mid-summer (early July) with those taken in late summer (August 15 to September 15) which is the period specified in the Byron Station Environmental Protection Plan (EPP). The reason for this comparison is that the aerial photography for the years 1977 through 1983 was done in the early July period to coincide with maximum chlorophyl development. There was concern that the shift to the later date (August 15 to September 15) would result in a loss of comparability with the previous surveys. Since 1984 was scheduled to be the last survey of the program prior to operation of the station it was decided to conduct two surveys, one utilizing July photography and the second using mid August photography with a comparison of the results.

The aerial photographs for both surveys covered an area of approximately 1 km radius centered at the Byron station cooling towers. The photographs were taken at a scale of 1 inch to 500 feet using false color infrared film. The first photographs were taken on July 11, 1984, the second on August 15, 1984. Field surveys were done on August 1, 1984, using the July 11th photographs and on September 5th using the August 15th photographs.

The examination and analysis of the photographs and the field surveys were performed by consulting plant pathologists. Dead, dying and stressed foliage tissues and different plant types were identified and marked on the photographs and then located during the field surveys to ascertain the cause of the signatures on the photographs.

The plant pathologists prepared a report covering the results of both surveys and a comparison of the results. The comparison concluded that while the earlier photographs were useful in identifying planting errors and soil type differences the second survey revealed additional diseases, mostly associated with corn and soybeans, that are only apparent on plants late in the season. The later survey also revealed additional cases of dutch elm disease and dead pine trees. The overall conclusion was that the later photography date was preferred but cautioned that it must be done early enough to allow the field survey to be done before the second week in September to avoid the risk of a possible early frost. A copy of the consultants report is submitted herewith together with a set of positive color transparencies encompassing the 1 km radius survey area.

The 1984 aerial photographic monitoring represents the baseline survey as specified in the EPP to be done once before the station goes into operation. The second survey of the program is to be done during the summer of 1986 which by the present schedule will be the first summer after the station has been in operation for one year.

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Section 4.2.2 Confirmatory Sound Survey

The station was not in operation in 1984, so no operational sound surveys were conducted. No noise-related complaints or inquiries were received by Commonwealth Edison Company concerning Byron Station during 1984.

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Attachment 1 (Continued)

RESULTS OF THE 1984 FOLIAR SURVEYS OF THE BYRON GENERATING STATION AND ITS ENVIRONS

Prepared by

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Barry J. Jacobsen, Ph.D

for

Commonwealth Edison Company

Chicago, Illinois

Introduction

The 1984 foliar surveys of the area encompassed by a 1 mile radius around the Byron Generating Station were undertaken to provide baseline data to assess the potential effects of saline aerosols from the plants natural draft cooling towers. This report is for the eighth annual foliar survey in the series initiated by Commonwealth Edison in 1977. The first three surveys were done by Espey, Huston, and Associates, Inc., Austin, Texas and the next four by Barry J. Jacobsen, and the 1984 surveys by B. J. Jacobsen and D. G. White.

This and previous surveys detail the plant diseases and other foliar abnormalities present in the area around the plant. These surveys should provide adequate baseline information to determine the immediate and long term effects of saline aerosol effluents from the cooling towers after the plant becomes operational in 1985.

The photography for all the previous surveys was scheduled for the first part of July each year so as to coincide with maximum chlorophyl development. The Byron station Environmental Protection Plan set a later date, August 15 to September 15, to allow a longer period of exposure during the growing season to increase in humidity, if any, and salt deposition. Since this was scheduled to be the last survey prior to operation of the station it was decided to conduct two surveys, one utilizing July photography, the second using the mid August photography. Comparison of data obtained at the different times in the same growing year will be useful in interpreting previous baseline data obtained in July.

Work by McCune et al.[1] indicates that damage from saline aerosols might be anticipated on sensitive plant species growing down wind from natural draft towers. However, the authors anticipated such damage only under certain environmental conditions. These conditions are high temperature, high humidity, still air, and prolonged thermal inversions.

The most sensitive plants growing in the vicinity of the Byron Station are alfalfa, American elm, and white pine.

Based on water quality in the Rock River water source (Harmon and Larson 1969 report), intended operating procedures, predominant meterological conditions in the Byron area, and cooling tower stack height, it is the judgement of these authors that acute damage from saline effluents is unlikely.

Water quality data indicate that potential saline effluents from the cooling towers would consist of various chloride and sodium salts. Damage to vegetation from these salts can either be acute (immediate) or chronic (long term). Acute effects would be marginal foliar burn, interveinal necrosis, or defoliation. Chronic effects could include increased susceptibility of woody plant species to canker diseases or loss of soil structure due to build up of sodium cores in the soil. Although chronic damage is not anticipated in the soil, such damage will be obvious under worst case scenarios 20 to 30 years in the future.

Modelling based on stack height, potential aerosol particle sizes, and meterological conditions, damage would be most likely to occur within 1/2 to 1 mile down wind from the cooling towers. Since the prevailing winds in the

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[1] McCune, D., D. Silbernam, R. Mandel, L. Weinstein, P. Freudenthal, and P. Giardina. 1977. Studies on the effects of saline aerosols cooling towers origin on plants. J. Air Poll. Contr. Assoc. 27:319-324.

area are predominantly westerly (southwest, west, or northwest) the area 1/2 to 1 mile east of the cooling towers would be potentially most affected by saline effluents. Therefore, this survey was done emphasizing the area within 1 mile of the natural draft cooling towers.

Methods and Materials

Aerial infrared photographs (Cibachrome prints) were taken by Aero-Metric Engineering, Inc. Sheboygan, Wisconsin on July 11, and again on August 15, 1984. The photographs were analyzed for indications of plant stress for the area within 1 mile of the natural draft cooling towers. With the photographs taken on July 11 the high level (2000 ft AGL) photographs were of excellent quality. However, the low level photographs were slightly overexposed but were usable for photograph interpretation. The photographs taken on August 15 were of excellent quality. Ground truth surveys were done on August 1 and again on September 5. The survey on August 1 was done be both authors and the survey on September 5 was done by D. G. White. Ben Barickman was present for both surveys.

Infrared photo photography was used to provide a permanent record of plant health in this area. Infrared photographs are useful in the identification of dead, dying, stressed foliar plant tissues, or different plant types since differences in chlorophyll levels allow for differential reflectance of infrared light from the plant canopy.

Photographs used in the first analysis and ground survey are numbered 1-1 to 1-5, 2-1 to 2-5, 3-1 to 3-5 and 4-2. The most northerly flight line is shown in photos 1-1 to 1-5 and the most southerly flight line in photos 3-1 to 3-5. Photographs used in the second analysis and ground survey are numbered 1-1 to 1-7, 2-1 to 2-7, 3-1 to 3-7 and 4-1 through 4-3. Again the 1-1 to 1-7

is the most northerly flight line and 3-1 to 3-7 the most southerly. The 4-1 to 4-3 are high altitude.

Results

No saline aerosol or salt related injuries were identified in the survey area. Abnormal signatures in infrared photos were found in ground surveys to be caused by weeds in crop fields, plant diseases, road side maintenance such as grading and the use herbicide brush killer, fertility problems, and soil type differences. Specific examples are given in the analysis of the following photographs. Specific sites are marked on the photos.

Survey One (Photographs taken on July 11 and ground truth survey on Aguust 1)

Photograph 1-1

Site 1-1-1 was identified as a misidentification of stressed foliage. Sites 1-2-1 and 1-2-1 are known areas of oak wilt disease damage.

Photograph 1-2

Sites 1-2-2 and 1-2-3 were identified as areas of variable crop growth due to differences in soil type.

Photograph 1-3

Site 1-3 was on private property and could not be ground truthed adequately. However, the signatures of the sites marked are consistant with tree death. Based on nearby sites either dutch elm disease or oak wilt disease are likely causes of tree death.

Photograph 1-4

Site 1-4-1 was identified as tree death due to dutch elm disease. Site 1-4-2 was a dead tree on private property. Site 1-4-3 was identified as corn stunted due to drought stress associated with sandy soils.

Photograph 1-5

Sites marked on this photo identify dead and dying trees. Again this site is on private property so specific identification was not done.

Photograph 2-1

Sites 2-1-1, 2-1-2, 2-1-3, 2-1-4 are discussed under photograph 2-2. Site 2-5 was identified as a hawthorn with severe foliar injury from the cedar-hawthorn rust disease. Site 2-1-6 was identified as drought damaged corn associated with sandy gravelly soils.

Photograph 2-2

Sites 2-2-1, 2-2-2, and 2-2-5 were identified as storm damage to elms. Site 2-2-3 and 2-2-6 were identified as dead or dying elms due to dutch elm disease. Site 2-2-4 was a large dead cedar. Lightning strike was the probable cause of death. Sites marked in corn fields are drought damage associated with sandy gravelly soils.

Photograph 2-3

Site 2-3-1 was found to be an eroded site with associated drought damage.

Photograph 2-4

Site 2-4-1 was identified as damage from dutch elm disease. Site 2-4-2 was identified as a tree killed by fill damage associated with the construction dump site. Site 2-4-3 was identified as storm damage and associated decay in large white oaks. Sites 2-4-4 and 2-4-5 identify dead or dying scotch, red or white pines. Most problems seem associated with lightning strikes or disease. Pine wilt nematode damage is strongly suspected to be associated with dead or drying scotch pines at site 2-4-4.

Photograph 2-5

Sites marked in corn fields in this photograph were identified as drought damage associated with sandy, gravelly soil sites.

Photograph 3-1

Site 3-1-1 was on private property but the tree stress at this site is judged to be due to damage from pastured animals. Site 3-1-2 was identified as damage from Dutch Elm Disease.

Photograph 3-2

Sites marked on this photograph are areas of poor corn growth associated with droughthy soils or in the case of site 3-2-1 a combination of droughthy soils and planter problems.

Photograph 3-4

Site 3-4-1 was identified as a row of catalpa trees showing decline due to decay.

Photograph 4-2

This high level photograph was used extensively in road surveys of the survey area. Specific sites are discussed below.

Sites 4-2-1, 4-2-4 and 4-2-19. These were all areas where right of way brush control with herbicides had killed or damaged woody plants such as boxelder, oak, elm, wild grape, etc. Site 4-2-4 was the only site where damage was the result of 1984 spraying.

Site 4-2-4. This alfalfa field and its environs were closely examined, alfalfa showed damage from Phytophthora root rot, common leaf spot, Stemphyluem leaf spot, and leaf hopper burn. A soybean field at this site showed damage from downy mildew, bacterial blight, and Phytophthora root rot.

Site 4-2-5. At this site, next to a house, elm and russian olive, were damaged by wetwood and phomopsis canker diseases respectively.

Site 4-2-6. Soybean fields in this area showed damage associated with a growth regulator type herbicide (Banvel type ?) which was applied along the

road side. This damage extended approximately 30 to 50 yards into the field.

Site 4-2-8. At this site there was a dead red cedar near the house. No diagnosis as to cause of death was made since this was on private property.

Site 4-2-9. This was a soybean field which showed damage from Phytophthora root and stem rot, brown stem rot, downy mildew, bacterial blight,and growth regulator type herbicide injury.

Site 4-2-10. This was identified as oak wilt damage.

Site 4-2-12. Near the house, the following diseases were identified, Poplar-Cytospora or Hepoxylon canker, fire blight on mountain ash, and a canker disease of willow associated with top dieback.

Site 4-2-14. Elms dying from dutch elm disease and scotch pines with damage from Diplodia tip blight were identified.

Site 4-2-15, 16, 17. These sites denote dead sumac, elm, and oak. Death is associated with canker diseases (sumac), road construction, storm, or disease elm and oak wilt.

Site 4-2-18. Autumn olive plantings at this site show severe winter injury damage.

Survey Two (Photographs taken on August 15 and ground truth survey on September 5)

Photograph 1-4

Site 1-4-1 was a soybean field where number of common diseases were present including septoria brown spot, downy mildew, pod and stem blight and stem canker.

Photograph 1-5

At site 1-5-1 an oak tree where severe iron chlorosis was found. Also

present was bacterial blight on brome grass (site 1-5-2).

Photograph 1-7

Site 1-7-1 was a downed oak tree that appeared to have fallen during a storm. 1-7-2 was a recently cut oak tree. 1-7-3 was hackberry with lacebug damage. 1-7-4 was dutch elm disease and 1-7-5 was autum olive with winter damage.

Photograph 1-8

Several trees with symptoms of dutch elm disease were found at site 1-8-1 and 1-8-2.

Site 1-8-3 was checked on the ground survey because of what appeared to be an irregular soil type. Much of the variation is due to soil type, however, a number of soybean plants with brown stem rot were found.

Photograph 2-2

At site 2-2-1 the strong signatures in this area were small cottonwood trees (5 to 9 feet tall) that had been girdled by what looked like rabbit feeding.

Site 2-2-2 was an alfalfa field that had plants with many of the common alfalfa diseases. During this survey common leaf spot, spring black stem and leaf hopper damage were seen.

Site 2-2-3 was a soybean field where bacterial blight, downy mildew, septoria brown spot and stem canker were evident.

Photograph 2-7

Site 2-7-1 was an elm tree that had recently died. Much of the elm in the survey area appears to have died from dutch elm disease however, because of the rapid death, phloem necrosis may have killed this tree.

Site 2-7-2 was three dead scotch pines. The cause of death was not

determined. The trees did have some of the symptoms of pine wood nematode with dying branches on adjacent trees. If pine wood nematode is present many of the red and scotch pines in this area will die. White pine is not normally infected. The corn field adjacent to the pine trees had anthracnose leaf blight, common rust and stalk rot.

Site 2-7-3 was marked because of the white and red pines which are good indicators of salt damage.

Photograph 3-3

Sites 3-3-1 to 3-3-3 were in an area that were on private property that had not been previously surveyed on the ground. The land owner was working in this area and gave permission to survey. 3-3-1 was a soybean field that contained plants with bacterial blight and brown stem rot. 3-3-2 was also in soybeans and had bacterial blight, stem canker, brown stem rot and pod and stem blight. 3-3-3 was a wooded area where several diseases were apparent including oak wilt, dutch elm disease and apple scab.

Photograph 3-4

At site 3-4-2 dutch elm disease was found on several trees. Also in this area canker on willow, powdery mildew on lilac and dieback on boxelder where seen.

Photograph 3-6

Sites 3-6-2 to 3-6-4 were near a farm house and were problems that had been noted previously. 3-6-2 is dutch elm disease on elm. 3-6-3 were dead scotch pines. 3-6-4 were scotch pines with Diplodia tip blight.

General Comments

Most of the signatures on the photographs used in the second survey had been noted during the first survey and had been previously ground truthed.

Crop Production Fields

Drought damage on all crops was very evident during the first survey and could still be seen during the second survey. The damage was most noticable where crops were planted on sandy soil types.

Corn. Common rust and nitrogen deficiency were common in many fields. Anthracnose leaf blight that was found in minor amounts during the first survey was still minor in the second. Since the crop was more mature during the second survey, corn stalk rot was apparent.

Soybeans. Damage from Phytophthora root and stem rot, bacterial blight, downy mildew and Septoria brown spot were found in most fields during the first survey. Brown stem rot damage was identified in one field. In the second survey Phytophthora root and stem rot was not as evident because damage to that disease usually occurs earlier in the season. Because the crop was more mature, stem canker and pod and stem blight were observed.

Alfalfa. Damage from leaf hopper that was very common during the first survey was not as evident during the second. Minor damage from leaf and stem diseases was seen in both surveys. Phytohthora root and stem rot was very minor compared to previous years.

Red Clover. Minor damage due to powdery mildew, anthracnose and Botrytis was evident in both surveys.

Woody Plants

Dutch Elm Disease was more severe this year than in the past while oak wilt was less severe than in previous surveys. Several trees that were not giving signatures in the photographs used in the first survey were apparent in photographs in the second. Some of the storm damaged trees (up rooted or broken) that gave signatures in the first photographs had lost all leaves and

were not evident in photographs used in the second survey. The diseased trees still retained enough foliage so that they were noted in the second photograhs.

White pine in the survey area is in good conditions with only minor damage from ozone. Red and Scotch pines in the survey area are not in good condition with symptoms of Diplodia tip blight, wood decay and possible pine wood nematode damage.

Cankers were common on sumac, blackberry and willow in the survey area.

Almost all grapes examined in the survey area showed damage from black rot and plant bug feeding.

Many black cherry trees showed dieback associated with decay and most had minor damage from cherry leaf spot.

Multiflora rose plants showed damage from black spot disease and winter injury.

Hackberry tree leaves had minor damage from nipple-gall mite.

Honeysuckle plantings west of the station showed damage from russian aphid.

Dogwood, damaged from Septoria leaf spot and drought, were evident throughout the survey area.

Hawthorn damage from cedar-hawthorn rust was common and severe.

Apple--frogeye leaf spot and apple scab were common.

Weeds and Other Plants in Non Crop Areas

Brome grass. Ergot and bacterial blight were common.

Burdock. Bacterial blight was common throught the survey area.

Wild strawberry. The leaf spot and leaf blight diseases were common where ever this plant was seen.

Conclusion

No saline aerosol or salt injury was identified in the area survey. Abnormal plant signatures noted on aerial photograhs were found to be due to soil differences, drought, plant diseases, insect damage, planter problems, or weeds.

Damage noted in previous surveys associated with road work, pipeline or transmission line construction has stabilized and in many situations is no longer evident.

Survey Time

In general only minor differences were found between the two survey times. The earlier survey was much better for identification of planting errors and soil type differences especially in soybean fields. Most diseases found in the first survey were also found in the second however, the second survey did find some additional diseases mostly associated with corn and soybeans that are only apparent on plants late in the season. The second survey did identify some additional dutch elm disease and dead pines. This author would prefer the later survey but it should be pointed out that the ground survey must always be complete before the second week in September prior to damage from a possible early frost.

Attachment 2

List of EPP noncompliances and corrective actions taken to remedy them.

NONE

Attachment 3

List of all changes in station design or operation, tests, and experiments made in accordance with Subsection 3.1 which involve a potentially significant unreviewed environmental issue.

NONE

Attachment 4

List of nonroutine reports submitted in accordance with Subsection 5.4.2.

NONE

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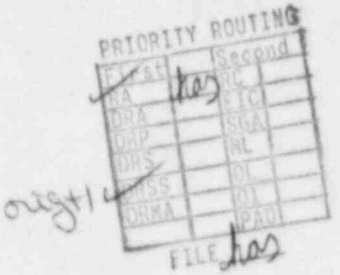

April 16, 1985

LTR: BYRON 85-0560
FILE: 2.7.300

Mr. James G. Keppler
Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

SUBJECT: EPP Annual Operating Report
Appendix B to Facility License No. NPF-37

Dear Mr. Keppler:

Attached is the Annual Operating Report for the implementation of the Environmental Protection Plan as required by Section 5.4 of Appendix B to Facility License No. NFP-37. This report is contained in Attachments 1 through 4 as indicated below:

Attachment 1 - Summaries and analyses of the results of the environmental protection activities required by Subsection 4.2.

Attachment 2 - List of EPP noncompliances and corrective actions taken to remedy them.

Attachment 3 - A list of all changes in station design or operation, tests, and experiments made in accordance with Subsection 3.1 which involve a potentially significant unreviewed environmental issue.

Attachment 4 - A list of nonroutine reports submitted in accordance with Subsection 5.4.2.

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In accordance with Regulatory Guide 10.1, one copy of this report is provided for your use and 18 copies are being submitted directly to the Document Control Desk, U.S. Nuclear Regulatory Commission, Washington, D.C., 20555.

Sincerely yours,

for R. E. Querio
Station Superintendent
Byron Nuclear Power Station

REQ/SDB/11a

Attachments

cc: P. F. Floeter, w/attachment
S. D. Brown, w/attachment
NRC Resident Inspector, w/attachment
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