# WALK-THROUGH SURVEY REPORT

Contract #210-77-0096
Coal Creek Station
Cooperative Power Association
Underwood, North Dakota 58576
Swanson & Youngdale Inc.
Painting Contractors
735 Florida Avenue
South Minneapolis, Minnesota 55426

DATE OF SURVEY
February 27, 1979

DATE OF REPORT
October 22, 1979

The Johns Hopkins University
Baltimore, Maryland

and

The National Institute for Occupational Safety and Health
Cincinnati, Ohio.

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## PURPOSE

To develop preliminary information concerning the suitability of this plant for inclusion in the investigation of health hazards in the painting trades. This site was identified through union contact as a site where union men work and where industrial hygiene practices can be identified.

## PERSONS CONDUCTING SURVEY

Genevieve M. Matanoski, M.D., Dr.P.H., Epidemiologist, The Johns Hopkins University
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## PERSONS PREPARING REPORT

Dr. Genevieve M. Matanoski, The Johns Hopkins University
Mr. Newton E. Whitman, The Johns Hopkins University

## PLANT CONTACT

Mr. Chuck Davis, Superintendent, Swanson & Youndale, Inc.

## UNION REPRESENTATIVE

Mr. Bob Brush, IBPAT (International Brotherhood of Painters & Allied Trades, AFL-CIO)

DESCRIPTION OF PLANT

The Coal Creek Generating Station now under construction near Underwood, North Dakota will include two identical 500 megawatt lignite coal fired electric generating units. The coal will be strip mined on the site and brought to the steam generators by truck and conveyor belt. Each of the two steam generators will consume about 400 tons of lignite per hour and generate 3,730,000 pounds of steam per hour. Also it will produce 5,000 to 14,000 pounds per hour of sulfer dioxide and 22,000 to 71,000 pounds per hour of fly ash. Fly ash is removed in electrostatic precipitators and sulfur dioxide in scrubbers. The clean gas from the scrubbers is mixed with some bypassed gas directly from the boilers so as to give the required thermal head for the 650 foot chimneys. It is claimed that the concentrations of fly ash and sulfur dioxide and the opacity of the plume will meet the pertinent standards even when the plant is operating at maximum capacity. The electrical energy thus generated will be conveyed to 34 rural cooperatives in Minnesota by a 400 KV direct current line. Details of the construction and operation of this power plant are described in the Fact Sheet prepared by the Corperative Power Association and United Power Association (Appendix 1). Construction of the plant is well advanced. No. 1 unit is expected to go on stream about 7/1/79. The other unit will not be ready until November 1981. Both units are enclosed under roof and heated so that work inside can proceed even in a North Dakota winter.

PAINTING OPERATIONS

At the time of the survey there were 30 painters employed at this project. The maximum number of painters working here so far has been 44. Unfortunately the painters went on strike the day of the survey so they could not be observed at work. However, a tour was made through the two generating stations where the painters were supposed to be working. From the tour it was obvious that although there was quite a bit of painting to be done in large fairly well ventilated spaces, much of the work would have to be done inside tanks or large pipes and other confined spaces. Moreover almost all painting is done with manually operated spray guns. When working in tanks or similar places the painters are required to wear Devilbiss spray painting hoods. These are clear plastic disposable hoods with a continuous air supply. The in-coming air is distributed so as to form an air curtain at the opening for the eyes. Apparently the painters do not wear goggles or safety glasses beneath the hood so the only eye protection is the air curtain. An electrically driven air compressor supplies breathing air. All tanks and other confined spaces are checked with an explosimeter before men are allowed to enter. When painting in large, well ventilated spaces or outside, the painters wear a 3M respirator No. 8712 with organic vapor cartridges with a prefilter. In addition to their usual duties the painters are required to do some abrasive blasting. Mr. Davis estimates that the

painters are occupied with blasting a total of about one month of each year. Most of the abrasive blasting is done with sand except that they may use a synthetic abrasive in confined spaces. They also carry out an operation known as blowing down which consists of using a compressed air hose to blow extraneous insulating material and other debris from floors or other surfaces which are to be painted. For most abrasive blasting and blowing down, the painters wear hoods, mechanical filter respirators and goggles. These operations are done on the second shift or on weekends to avoid exposing the other tradesmen. Apparently there is some exposure to asbestos which is applied by the insulators to the outside of high temperature steam pipes as a cement or paste and is blown onto the tops of boilers. The application of asbestos insulation to the boiler tops is generally done when most other workers are absent. However, painters are sometimes present when this operation is in progress. Most of the insulating material appears to be asbestos free.

Product data sheets are supplied for the paint being used on this project. While these sheets may not be as informative as the regular material safety data sheets they do give some idea of the paint mists and vapors to which the painters may be exposed. Many of these products are epoxy coatings including one, carbomastic #14, which is an epoxy containing coal tar.

It is estimated that the painting work on this project will last until 3/1/80. In addition there is a distinct possibility that this same crew will be employed on other similar projects nearby for sometime after this work terminates.

WORKFORCE AND PERSONNEL RECORDS

The contractor, Swanson and Youngdale, has 30-40 painters working on site plus a superintendent and a clerk and two supervisors. They expect this number of painters to work for the next two years. Most of these painters are transients and many follow power plant construction. A few are from Minneapolis, the main base of the contractor. There are some of these workers who tend to move on before the job is done but the majority of them appear to remain with the work until completion. No women work in painting and the minority distribution is believed to be similar to that of North Dakota. The contractor keeps no records on these employees after the time of the current job. They are union workers and therefore the union should have records of these men.

DESCRIPTION OF THE MEDICAL PROGRAM

The first-aid station is staffed by two nurses during the day shift unless there is extra work in which case they add an additional nurse. The owner of the power plant, the Cooperative Power Association, must supply the nurses. There is an ambulance on site as well. The nurses record accidents and injuries but do not treat otherwise. The contractor receives no copies of these medical records. He believes they are held by the company who owns the power plant. In this case they will be retained for all workers under all contractors in a complex.

## SAFETY AND INDUSTRIAL HYGIENE

Safety and industrial hygiene programs are rather rudimentary. All superintendents and foreman are required to attend a first aid course and become qualified as first aid attendants. Also a safety meeting is held once a week with the painters. In addition, all contractors on the job have a safety meeting weekly. Moreover, there is a superintendent in the home office of Swanson & Youngsdale in Minneapolis who is in charge of safety for the corporation. He sends literature on safety and health to the superintendent on the job who passes the information on to the workers. The painters have the responsibility of cleaning and maintaining their own respirators. The chemical cartridges are generally changed weekly but the filters may be changed as often as twice daily.

## REPRESENTATIVE COATING COMPONENTS

The contractor supplied all of the product description sheets which were available on site. Multiple materials were used often in small quantities for specific jobs at specific sites.

The commonest paint products in use are an acrylic-based product. Carboline 1294 which is used in wall-coverings and GP-65 which is an alkyd-based product used for covering equipment and steel structures. The total use of these paints for the current operation is 20,000 gallon. We have no further information on the content of these paints. If an in-depth industrial hygiene measure is proposed for this site, additional detailed information must be obtained from suppliers about specific paint formulations.

The following paint usage was identified:

| | |
|---|---|
| Carboline 1294<br>GP-65 | Finish Coating - acrylic & oil alkyd<br>Painters 30-40<br>Approximate - 20,000 gallons<br>Applied - spray |
| Amerco #64<br>Carboline 290WB | Primer Coating - polyamire-cured epoxy<br>Painters 30-40<br>Approximate - 20,000 gallons<br>Applied - spray - use of fresh airhood with #64 |
| Carbomastic #14 | Pipe inner finish - epoxy-coal tar<br>Painters ?<br>Approximate - Amount unknown but small<br>Applied - spray |
| Carbo Zn 12 | Exterior covering for tanks - inorganic Zn primer<br>Painters ?<br>Approximate - small amount |

| | | |
|---|---|---|
| Amercoat #66 | Inside tank lining | - Polyamid-cured epoxy |
| | Painters | - ? |
| | Approximate | - Small amount |
| | Applied | - Spray - airhood |
| Carboline 4631 | Aluminum coating for pipes | - modified silicone |
| | Painters | - 30 |
| | Approximate | - 400 gallons |
| | Applied | - Brush or roller over hot pipes |

Silica - sandblasting done by painters on site for surface preparation.

## CONCLUSIONS

The painters who work on construction projects such as the Coal Creek Power Station have, potentially at least, significant exposures to a number of serious health hazards including paint vapors and mists, free silica and asbestos. A careful industrial hygiene study would very probably be of considerable benefit in providing information to reduce their exposure to such hazards. Both the management and the union appear to be cooperative. While there may be some turnover in the painting crew, Mr. Davis has pointed out that there are quite a number of painters who will stay with Swanson & Youngdale as long as there is sufficient work. Moreover, there seems to be a strong possibility that additional work of the same kind will be available to this crew.

The power plant would be an interesting site to identify various paint uses. The records of the contractor can not be utilized, however, for epidemiological studies of mortality or morbidity since there are no records of workers' health and injury. It is possible to study mortality and possibly morbidity through records of the unions in the local area.

## RECOMMENDATION

Since there are a number of these large electric power projects which will be erected in western North Dakota in the near future, it is recommended that the union and the contractors Swanson & Youngdale and possibly others be considered for an in-depth study of painting.

# Appendix 1

COAL CREEK ELECTRIC GENERATING COMPLEX

DESCRIPTION OF PLANT, MAJOR COMPONENTS

THE COAL CREEK GENERATING STATION, now under construction on a 2,560 acre site five miles south of Underwood, North Dakota, will incorporate two lignite coal-fired steam-electric generating units, each having a power capacity of 500 megawatts. The first of these units is scheduled for completion in November, 1978. The second unit is scheduled to be completed and ready to generate power by November, 1979.

HEART OF THE COMPLEX is the generating plant with its two 500 megawatt units. However, supporting elements will include disposal ponds for ash and by-products of the plant's coal burning; a station for converting the alternating current produced to direct current; an active coal processing system and stock pile and a water storage pond.

LIGNITE WILL BE TRUCKED from the mine to an overhead conveyor nearly 3/4 of a mile long. The conveyor's belt is 60 inches wide and has a capacity of handling 2,500 tons per hour. Coal from the conveyor will either be stored or pulverized. On site lignite storage capacity will be 1,026,000 tons -- enough to fuel the two plant units for 60 days.

TURBINE-GENERATOR UNITS will consist of a high pressure turbine and an intermediate pressure turbine in one casing, two low pressure turbines in separate casings, a main generator, and an exciter. Each turbine will have a rating of 500 megawatts, or 737,000 horsepower. Each turbine is 135 feet long, 15 feet wide and 22 feet high.

MAIN CONDENSERS for each turbine generator unit will condense exhaust steam back to condensate (water) for re-use by the steam generator. These condensers will each have 280 miles of stainless steel tubing per generating unit. Some 195,000 gallons of cooling water will flow through each of these condensers every minute. The heat absorbed by condensers cooling the water will be 1,240,000,000 BTU per hour -- the equivalent of 95 tons of lignite per hour per unit.

SINGLE STEAM GENERATORS will supply each turbine generator. The main steam flow handled by each of these generators will be 3,730,000 pounds per hour. Overall dimensions of each of these steam generators will be 96 feet wide, 48 feet deep and 231 feet high. The water flowing through these steam generators has a quality equal to triple distilled, far in excess of the quality most people drink.

TWO AUXILIARY BOILERS for the plant have an individual steam flow of 130,000 pounds per hour.

WATER SOURCE for the Coal Creek Generating Station is the Missouri River, six miles away. The water will be brought to the site by an underground pipeline and stored in a 60-acre pond.

CHIMNEYS on the two units will reach a height of 658 feet and will be the second tallest manmade structure in North Dakota. There will be one for each steam generator. The concrete shell at the bottom of the chimney is 58 feet in diameter. The brick lining inside each chimney is 22 feet in diameter. Precipitators near the chimney remove 99.7 of all flyash.

September, 1976

HOUSING will be an important concern of the new residents and workers moving to the areas surrounding Coal Creek. During the active operation of the mine and plant, NDSU estimated that over $11 million in new housing of all types will be required. Coal Creek Project developers have been concerned with this need from the start. They were the first to begin housing development in the Underwood area -- just 5 miles north of the plant site -- with housing development expected to provide 62 finished dwellings before the fall of 1977.

Prepared by Cooperative Power Association and United Power Association for public information and understanding. Contents may be reprinted. For additional information or questions, contact:

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