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Permitting Procedures for Coal Port Construction

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Summary

The author reviews the major steps to be taken in order to receive the necessary permits for the construction of coal handling ports.

The various federal and state air and water quality requirements are discussed as well as the regulations imposed by the Army Corps of Engineers. Based on the experience of the author coal handling facilities can easily meet the established standards, but problem solving through advance planning is recommended.

1. Introduction

The environmental and regulatory factors for building a coal transfer facility are among the most complex and challenging parts of facility development. Each regulatory agency must make an evaluation of the probable impact of the proposed facility on the public. In order to protect the health and welfare of society, the federal government and individual states have established certain standards (laws) which provide that no facility be constructed or operated which will violate these standards. Based on our experience, coal handling facilities can easily meet these standards, as evidenced by the number of coal terminals approved by the federal and state agencies throughout the United States.

This paper is based on experience gained in obtaining permits for the following coal terminals:

- Massey Coal Terminal: 15 · 10^6 t/year rail to ship export terminal in Newport News, VA. (Fig. 1)
- Cora Dock Corp: 15 · 10^6 t/year rail to barge terminal in Cora, IL. (Fig. 2)
- American Commercial Barge Line Terminal: 10 · 10^6 t/year rail to barge terminal in St. Louis, Missouri. (Fig. 3)
- International Marine Terminals: 12 · 10^6 t/year barge to ship terminal in Plaquemines, Parish, La. (Fig. 4)

Complicated permit procedures often frustrate or seriously delay many projects. The length of time required in preparing a permit application depends on the location and size of the proposed facility. Permit applications submitted for a new facility located in the same region as a recently permitted facility should take a shorter period of time because contacts have been established and most of the required information has been gathered and approved for the existing facility.

2. Methodology

The key to successful permitting is an experienced permitting staff, along with a proven permitting approach. The permitting engineer assigned to the particular project directs all permitting activities and coordinates the preparation and submittal of all environmental reports and permit applications. He is the key contact with the client on all permitting matters and is responsible for controlling the project and engaging outside specialists where necessary. A primary goal of the permit engineer is to establish and maintain an effective personal working relationship with all regulatory authorities. Fig. 5 outlines in detail the permit application process.

2.1 Permit Audit

The first step in the permitting process is the permit audit which is a comprehensive series of interviews with federal, state and local agencies in order to determine all pertinent permits required for the facility. The audit is usually conducted as part of the engineering feasibility study as soon as a limited amount of conceptual design work has been completed. Initially, telephone contact is established with all regulatory agencies to determine project jurisdiction. Copies of pertinent regulations are solicited and major requirements are discussed. Fig. 6 through 8 show the interrelations between various major permits that must be obtained.

Upon completion of the audit, a preliminary schedule for the total permitting process is established. This schedule reflects all permitting activities and establishes when designated design information is required. During this phase, the permitting engineer begins matching the audit results with the preliminary conceptual design to produce an economical and environmentally acceptable project.

2.2 Pre-Application Meetings

The second step in the permitting process is the pre-application meetings, which are arranged with the regula-

Fig. 1: Massey Coal Terminal, Newport News, VA. This coal transfer facility was designed by Dravo, who also managed construction. The facility has a tandem rotary car dumper/positioner system capable of unloading trains of random coal cars at the rate of 5000 tons per hour. The one-million-ton ground storage facility consists of overhead shuttle belt conveyors and gravity reclaim tunnels feeding directly to an 8,000 t/h traveling shiploader. This facility features an innovative computer-assisted control system designed to monitor each coal shipment from mine to ship including on-site unloading, storing, reclaiming, blending and shiploading. The annual throughput capacity of the site upon completion will be 10 to 15 million tons.

Fig. 2: Cora Dock Corp. facility with a maximum ground storage capacity of 700,000 tons.

tory agencies responsible for those permits which directly affect project feasibility. At these meetings, the preliminary project plans are presented, and the interfaces with the permit process are discussed. As part of the permit audit and pre-application meetings, an "Agency Interrelation Matrix" [1] is developed (see Fig. 9) to make sure that letters of transmittal and copies of pertinent documents are distributed to all appropriate agencies. These meetings prove to be extremely important to the permitting process in that they:

1. Establish rapport with agency personnel
2. Establish credibility and willingness to work with the agency
3. Help define in depth the permitting process for the specific project under consideration
4. Determine the depth and detail of any specialist's studies required
5. Obtain "off the cuff" information on local conditions, local opposition or regulatory agency preference which, when addressed early, will expedite the permitting process.

A primary goal of both the permit audit and pre-application meetings is to understand the requirements of the various government agencies and conduct all business with them in a professional manner. Under no circumstances should the need for a permit or the conditions of a particular permit come as a surprise. By identifying and dealing with critical issues early, the permit engineer eliminates the time-consuming and expensive task of reworking site plans after substantial financial commitments have been made.

2.3 Permit Applications

In addition to the completed agency forms, typical permit applications include narrative descriptions of the entire project, conceptual drawings and photographs of similar equipment. The purpose of the additional information is to prevent any misinterpretation of project plans. For major permits, the application is usually delivered personally and discussed with the regulatory agency. Following submittal of the major permits, the permit engineer expedites each permit individually by maintaining close contact with agency personnel on a frequent basis. Where necessary, follow-up meetings are scheduled to discuss specific problems.

It is sometimes necessary to engage consultants in very specialized fields or localities to handle specific tasks. Examples of consultants who may be necessary include: local archaeologists, attorneys, land surveyors, hydrographic surveyors, terrestrial or aquatic biologists or recognized local authorities on coal dust emissions or coal pile leachate. Such local contacts and recognized authorities have substantial credibility with regulatory agencies, particularly at public hearings or meetings.

3. Federal and State Air Permits

The major air pollutant from a coal handling facility is "fugitive dust" which is a particulate emission resulting from coal handling and open storage piles. A construction and operating air permit is required by each state before terminal construction can begin.

Fig. 3: American Commercial Barge Line Terminal, St. Louis, MI, can accept unit trains of Western Coal with a total ground storage of 500,000 tons handled by a stacker/reclaimer.

The federal government and each individual state has established levels of particulate emissions considered safe, allowing for an adequate margin of safety for public health. These are defined by the National Primary and Secondary Ambient Air Quality Standards. The primary standards were set for the protection of human health. Secondary Standards were set for the protection of welfare, which include effects on soils, water, crops, vegetation, and so on [2].

3.1 Coal Transfer Terminals vs. Power Plants

Coal transfer terminals are not major contributors to ambient air quality deterioration. The Clean Air Act includes a list of source categories of air pollution which ''cause or contribute to the endangerment of public health or welfare''.

The Code of Federal Regulations defines ''Major Stationary Source'' as any of 28 source categories which emits or has the potential to emit any of the criteria pollutants, including particulate emissions, in amounts exceeding 100 tons/year or unlisted sources which emit or have the potential to emit over 250 tons/year [3]. A coal transfer facility is not one of the 28 listed sources and a properly designed terminal will never emit pollutants exceeding 250 tons. Therefore, a coal transfer facility is not considered a ''major stationary source''. Thus, many coal terminals have been approved by state and federal agencies throughout the U.S.

However, the power plant material handling and storage system is considered an integral part of the entire plant facility. As such, regulations developed for fossil-fuel fired steam electric plants of more than 250 milion Btu/h heat in-

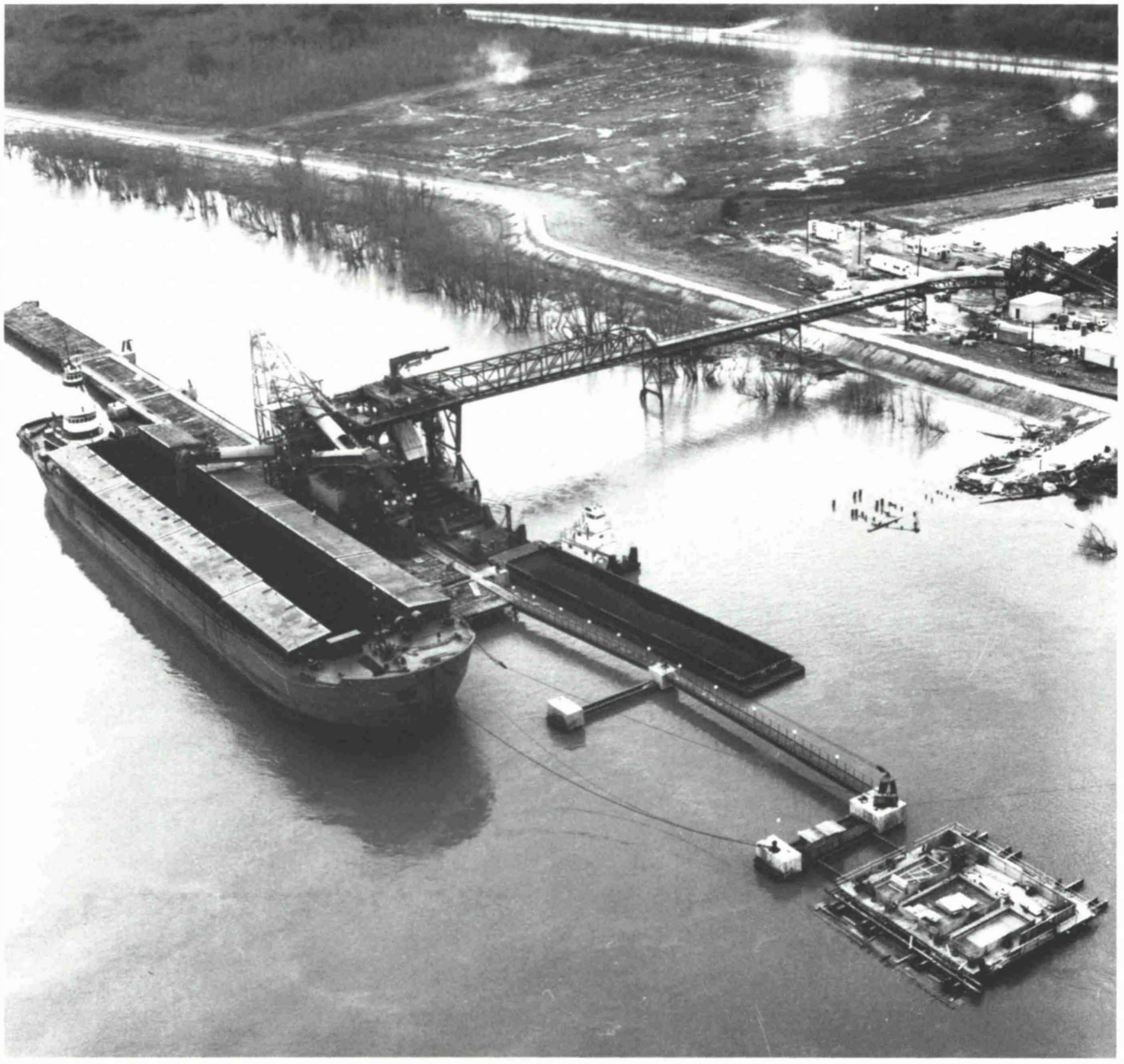

Fig. 4: International Marine Terminals Plaquemines Parish, LA facility. Although a phased construction program was planned, Dravo and IMT submitted all permit applications based on the maximum throughput level.

put apply to the material handling and storage system as well.

A power plant must quantify all air emissions to determine if 40 CFR 52.21, Prevention of Significant Deterioration (PSD) of Air Quality, applies. (See the Section on PSD, which follows). Because the power plant is one of the 28 source categories, the facility is subject to PSD New Source Review (NSR) if it has the potential, after control equipment, to emit any of the criteria pollutants in amounts exceeding 100 tons/year. The calculations to determine the potential to emit total suspended particulates must *include* fugitive emissions from coal piles and any other material storage piles located at the plant site.

If none of the criteria pollutants are emitted in excess of 100 tons/year, no further analysis is required. However, if any *one* of the pollutants exceeds the 100 ton/year limit, a PSD New Source Review must be undertaken. Once a PSD NSR has been triggered, a Best Available Control Technology (BACT) review is required for each pollutant emitted in quantities higher than the allowable levels.

A BACT review for particulate matter is required if the facility has the potential to emit more than 25 tons/year of total suspended solids. Best Available Control Technology is determined on a case-by-case basis taking into account energy, environmental, and economic impacts and other costs. Control technology and subsequent emission limitations (including a visible emission standard) are therefore negotiable with the EPA.

Power plants are predominately located in a Class II areas. The maximum allowable increase in pollutant particulate matter levels over baseline concentrations are limited as follows [4]:

Annual geometric mean:	19 $\mu g/m^3$
24-h maximum:	37 $\mu g/m^3$

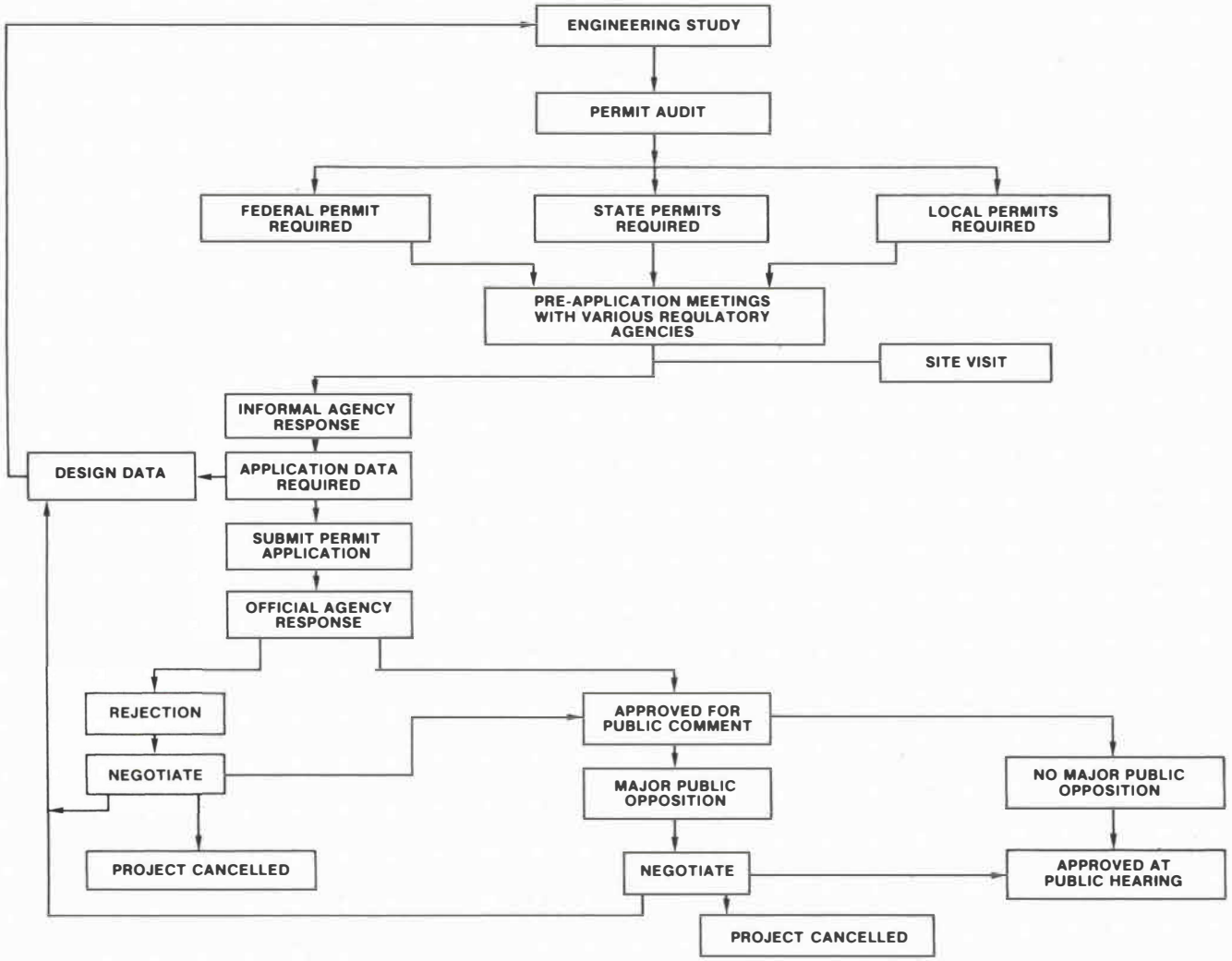

Fig. 5: Typical flow diagram for major permits

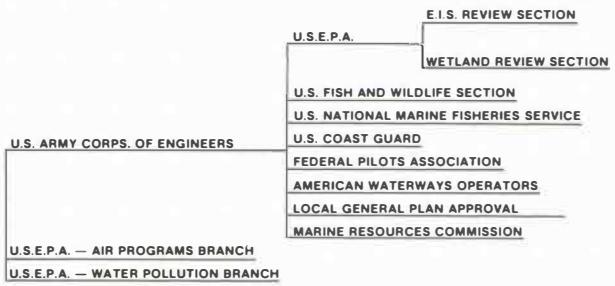

Fig. 6: Federal permits required

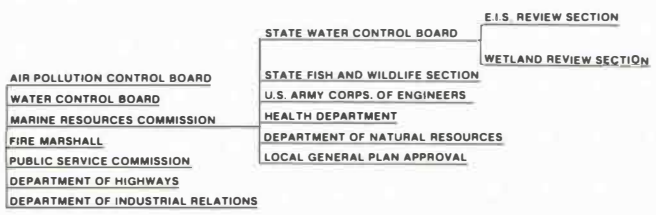

Fig. 7: State permits required

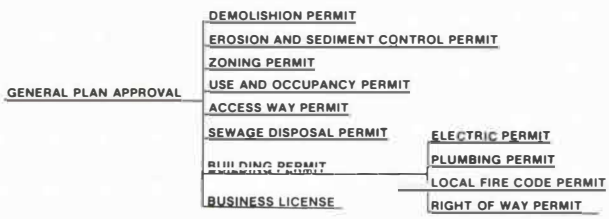

Fig. 8: Local permits required

The incremental increase in particulate matter concentration plus the baseline concentration shall not exceed the primary or secondary ambient air quality standards.

Primary Standards [5]

a) 75 $\mu g/m^3$, annual geometric mean

b) 260 $\mu g/m^3$, maximum 24-hour concentration not to be exceeded more than once per year

Secondary Standards [6]

a) 60 $\mu g/m^3$, annual geometric mean

b) 150 $\mu g/m^3$, maximum 24-hour concentration not to be exceeded more than once per year

3.2 Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) of the Clean Air Act requires each state to achieve or maintain air quality at least equal to the national air quality standards. Although a PSD Permit is not applicable for coal terminals because emission rates are below those given in the U.S. Air Pollution Control Regulations, it is necessary to show compliance to the air quality regulations of the EPA, so that other bodies of government can take final action on their appropriate permit application.

The first step in producing an economical and environmentally acceptable facility is to determine from the U.S.E.P.A. or State Air Pollution Control Board the national ambient air quality standards of the area where the facility will be located. The three possible classifications are:

1. Attainment — The area is below the primary and secondary health standards.
2. Non-attainment — The area exceeds the primary or secondary health standards. An attainment area will be re-designated non-attainment if a number of violations of the health standards is documented over a two year period. A new facility in a non-attainment area will be subject to the off-set policy if PSD applies.
3. Unclassified — An area with lack of or questionable data. The area will be unclassified because the air quality is not known to be above or below the standards. Usually treated in PSD review as an attainment area.

3.3 Emission Calculations

Suspended particulate emissions are calculated for each transfer point and are based on the following formulas:

Uncontrolled Emissions:

$$\text{Ton/Year} = \frac{\text{Process Flow Rate (ton/year)} \times \text{Emission Factor (lb/ton)}}{\text{2,000 (lbs/ton)}}$$

Controlled Emissions:

$$\text{Ton/Year} = \text{Annual Uncontrolled Emissions (ton/year)} \times (100 - \text{Percent Dust Control Efficiency})$$

Control efficiencies will vary according to the type of transfer point under consideration (eg. rotary car dumpers, conveyor transfers, storage piles, and stacker/reclaimers). The control efficiencies are based on published reports, past permit applications and engineering judgement. A typical coal terminal with 10 million ton/year throughput and one million tons of ground storage would have about two dozen emission points. A power plant coal handling and storage system, on the other hand, would have many more, as shown in Fig. 10. This is because coal terminals do not need the built in system redundancy of a power plant.

Additionally, in evaluating the emissions from the facility, unique site specific factors, such as the following items are considered:

- moisture content of coal handled (percent)
- silt content of coal handled (percent)
- mean wind speed at proposed facility (mph)
- dry days per year
- percent of time the wind speed exceeds the mean wind speed

Fig. 9: Agency Interrelation Matrix

LETTER TO \ COPY TO	CORPS - PERMITS	CORPS - LEVEES	CORPS - F&M	LA. PUBLIC WORKS	LEVEE DISTRICT	LA. STREAM CONTROL	LA. HEALTH DEPT.	LA. WILDLIFE	PARISH PRESIDENT	PARISH SANITARIAN	LA. D.O.T.	CUSTOMER	DRAVO CORP.
CORPS - PERMITS	X			X	X	X	X	X	X		X	X	X
CORPS - LEVEES		X										X	X
CORPS - F&M			X									X	X
LA. PUBLIC WORKS	X			X	X							X	X
LEVEE DISTRICT	X			X	X				X			X	X
LA. STREAM CONTROL	X					X	X	X				X	X
LA. HEALTH DEPT.	X					X	X	X		X		X	X
LA. WILDLIFE	X					X		X				X	X
PARISH PRESIDENT	X								X	X		X	X
PARISH SANITARIAN									X	X		X	X
LA. D.O.T.											X	X	X

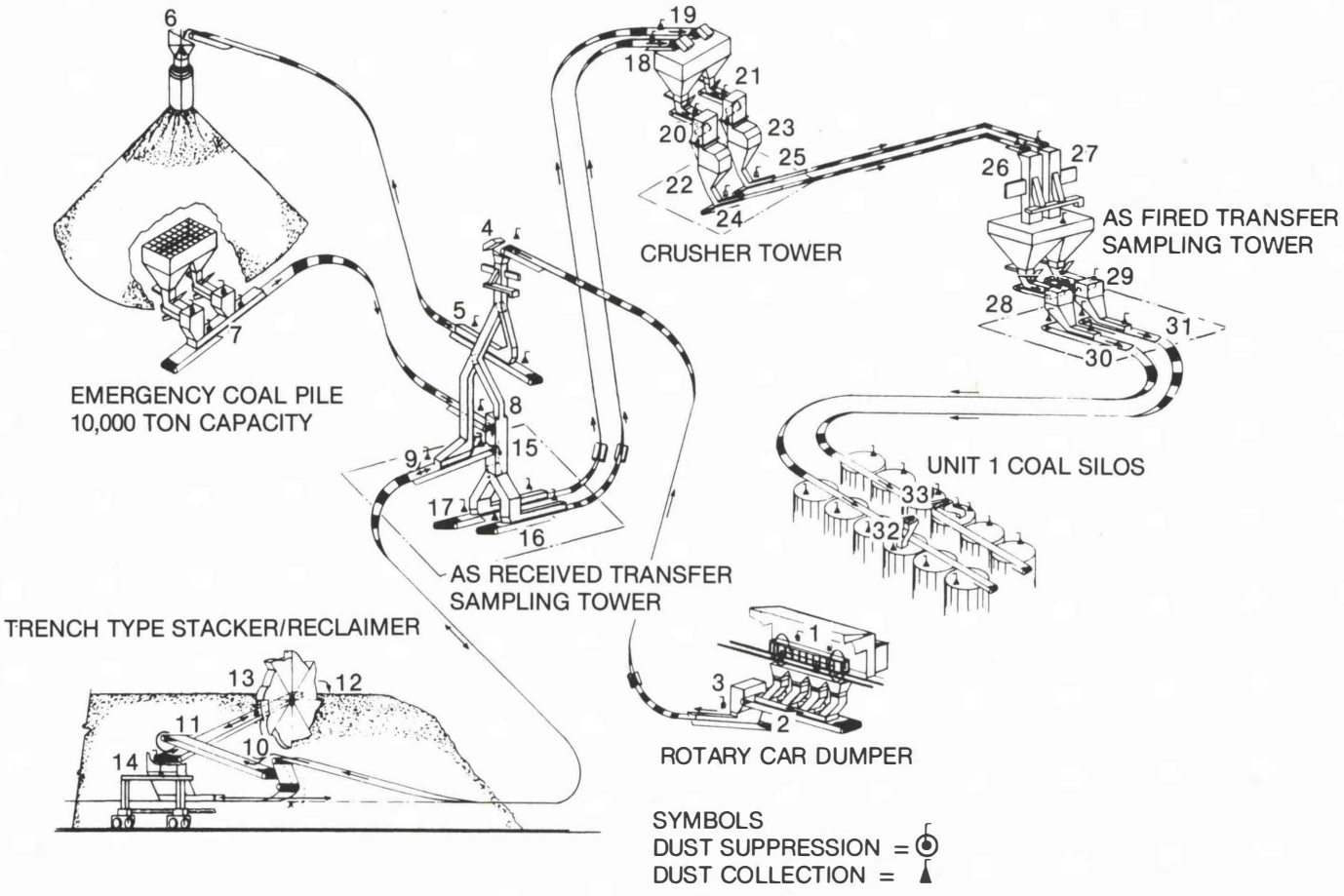

Fig. 10: Emission point diagram

In general, all permit applications are submitted based on the facility constructed to, and operating at, the maximum intend throughput level. As an example, a recently permitted facility, that is to be built in phases was permitted based on a total future annual throughput of 15 million tons/year with a 2.5 million ton storage yard. For this facility the maximum fugitive emissions from any combination of possible operating modes was calculated to be 55.84 lbs/h. The expected annual amount of fugitive dust emitted from this facility is 71.9 tons/year.

In our experience, the opacity requirements established by most state regulatory authorities has been 20%. Although a coal transfer facility is not a preparation plant the standard cited by officials in usually the USEPA New Stationary Source Performance Standards-Subpart Y, which sets an opacity of 20% for coal handling and storage equipment. Based on our experience, the opacity from fugitive emissions most of the time, will be substantially below 20%.

3.4 Description of Air Pollution Control Equipment

In order to minimize the amount of particulate coal dust entering the atmosphere, a number of design features are incorporated in the design of a coal transfer terminal. These features include:

1. Totally enclosed transfer chutes designed to minimize dust leakage
2. Conveyors protected from wind action by dust hoods, dribble pans and wind guards (see Fig. 11)

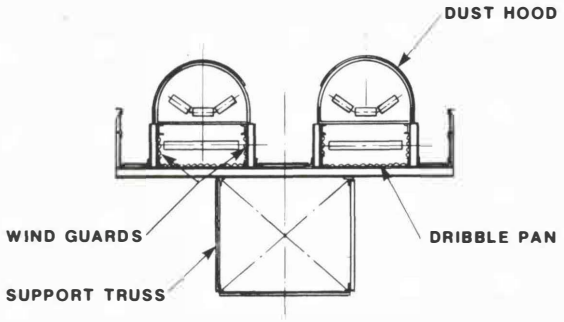

Fig. 11: Conveyor cross-section

3. Conveyor transfer points equipped with a dust suppression spray system. At these transfer points, spray header assemblies are provided to spray a water base dust suppression agent
4. Using equipment designed to minimize dust generation. This can be done when coal is to be stacked or reclaimed from open storage piles by using telescoping chutes, stacking tubes, underground reclaim or luffing booms designed to minimize the free fall of the material
5. Rotary railcar dumpers or railcar loadout stations located in a building to provide an enclosed discharge area.

3.5 Open Storage Piles

The most cost effective approach to stockpiling large amounts of coal is the open storage pile [7]. Coal, which

Fig. 12: Dust suppression system at car dumper installation

has either been discharged from railcars or unloaded from barges, will be "wetted" by a dust suppression system (see Fig. 12) prior to reaching the storage pile. Under normal circumstances this should be sufficient to minimize the fugitive emissions from the pile. However, should abnormal weather conditions such as prolonged dry weather or heavy winds cause the storage pile to dry out, the piles can be sprayed with a crusting agent.

Crusting agents are used to create an artificial surface to trap the small particles by applying a chemical binding agent to the face of the pile. The thin solid crust will normally last several months to a year depending on the type of chemical agent used and the local weather conditions. Other design considerations in controlling dust emissions caused by wind action on the storage pile would include possible tree planting for a wind break, using the lowest economical pile height and rounding the pile profile if possible.

4. Water Quality Permits

Rain falling on coal piles can present two separate water quality concerns: total suspended solids (TSS) and acidity (pH). The Federal Water Pollution Control Act of 1972, prohibits any person from discharging wastewater into U.S. surface waterways from a point source, unless this discharge is authorized by a permit issued by the U.S. Environmental Protection Agency or an approved state agency. This is referred to as a National Pollution Discharge Elimination System (NPDES) Permit. The federal effluent limitations are based on the degree of effluent pollutant reduction attainable using the best practicable control technology currently available [8].

There are presently no effluent guidelines for coal stockpile runoff from a transfer terminal. The regulatory agencies usually follow guidelines developed for coal pile runoff from a power plant facility. The effluent limitations for this runoff are [9]:

Total Suspended Solids:	not to exceed 50 mg/l
pH:	within the range of 6.0 to 9.0

The facility must be designed, constructed, and operated to treat the runoff from the 10 year-24 hour rainfall. Some states require a facility design capable of handling the greater runoff associated with a 25 year-24 hour rainfall event.

If a state does not have NPDES jurisdiction, a permit to discharge waste water must be obtained from the State Water Control Authority. The effluent limitations in the state permit will usually be the same as those specified by the federal NPDES permit. Most states have developed water quality criteria for each water body within the state. A waste water discharge permit will be issued if it is determined that the discharge will not affect the water quality of the receiving stream beyond the mixing zone.

4.1 Anticipated Water Quality

The quality of the stormwater runoff from the site is dependent on a number of factors, including the type of coal, the length of time since the antecedent rainfall, the age of the coal pile and the hyetograph of the rainstorm.

The major water quality concern from the runoff is suspended solids. The level of suspended solids is dependent on the intensity of the storm with higher levels of solids occurring from more intense storms.

The second water quality concern is the potential for acid drainage and the associated iron and other metals that may be dissolved in the runoff. The phenomenon is created by the oxidation of iron pyrite, a sulfur bearing mineral and subsequent dissolving in a rainstorm. The chemical reaction is represented as follows:

$$FeS_2 + \frac{7}{2} O_2 + H_2O \rightarrow Fe^{2+} + 2SO_4^{2-} + 2H^+$$

The condition does not always occur, depending on the coal stored. The potential increases with age of the pile as fines settle towards the bottom and may occur, if at all, only in latter years of the life of the coal pile.

4.2 Stormwater Runoff

All rain falling on coal storage piles must be collected and treated prior to discharge. Stormwater treatment plans usually require a series of gravity collection ditches located as close as practical to the coal piles (see Fig. 13). Water in the ditches flows by gravity to a treatment pond. After treating, water is pumped to a nearby waterway. Ditches are sized for the flow expected from the 1 hour/10 year rainfall event.

Rainfall outside of the coal storage area is permitted to drain to the natural watercourses. Dust hoods and dribble pans are provided on all conveyors located outside the storage area to prevent stormwater contamination. Seepage into a dumper vault or underground reclaim tunnel is pumped to a nearby ditch for gravity flow to the treatment pond.

Fig. 13: Dravo designed these collection ditches surrounding the coal storage area and the retention pond to provide adequate drainage and treatment of stormwater runoff at Cora Dock

Generally, because of the relatively flat character of terminal sites, very little regrading is necessary. However, the upper foot of topsoil must be removed to provide a stable base for the pile. The exposed naturally occurring clays, as well as any fill are prepared to minimize seepage.

An economical treatment system will provide a minimum of 24 hours of detention time to settle suspended solids resulting from the 10 or 25 year, 24 hour storm. In later years, if required, a lime neutralization unit can be installed at the intake to the pond. Required monthly sampling results under the NPDES program will provide a mechanism to identify the inception of any acidity problem. Pond construction may also be "phased" to parallel the growth of the coal handling system. Fig. 14 illustrates a collection systems, including two settling basins and an oxidation pond sized to handle "Phase One", which was expanded when coal storage requirements increased.

4.3 Dust Control and Washdown

Water, mixed with a wetting agent, is sprayed on the coal to minimize dust. Dust suppression water essentially remains in the coal and is shipped out with it or evaporated. No measurable quantities are lost in an aqueous effluent from the operation. Typical wetting agents are non-ionic detergents which are very similar to the detergents used in millions of U.S. households.

5. Army Corps of Engineers

One of the most important permits required prior to coal terminal construction is the "Department of Army Permit" issued by the U.S. Army Corps of Engineers. This permit is site specific and is required for both structures and work in or affecting the navigable waters of the United States. Federal regulations define navigable waters as:

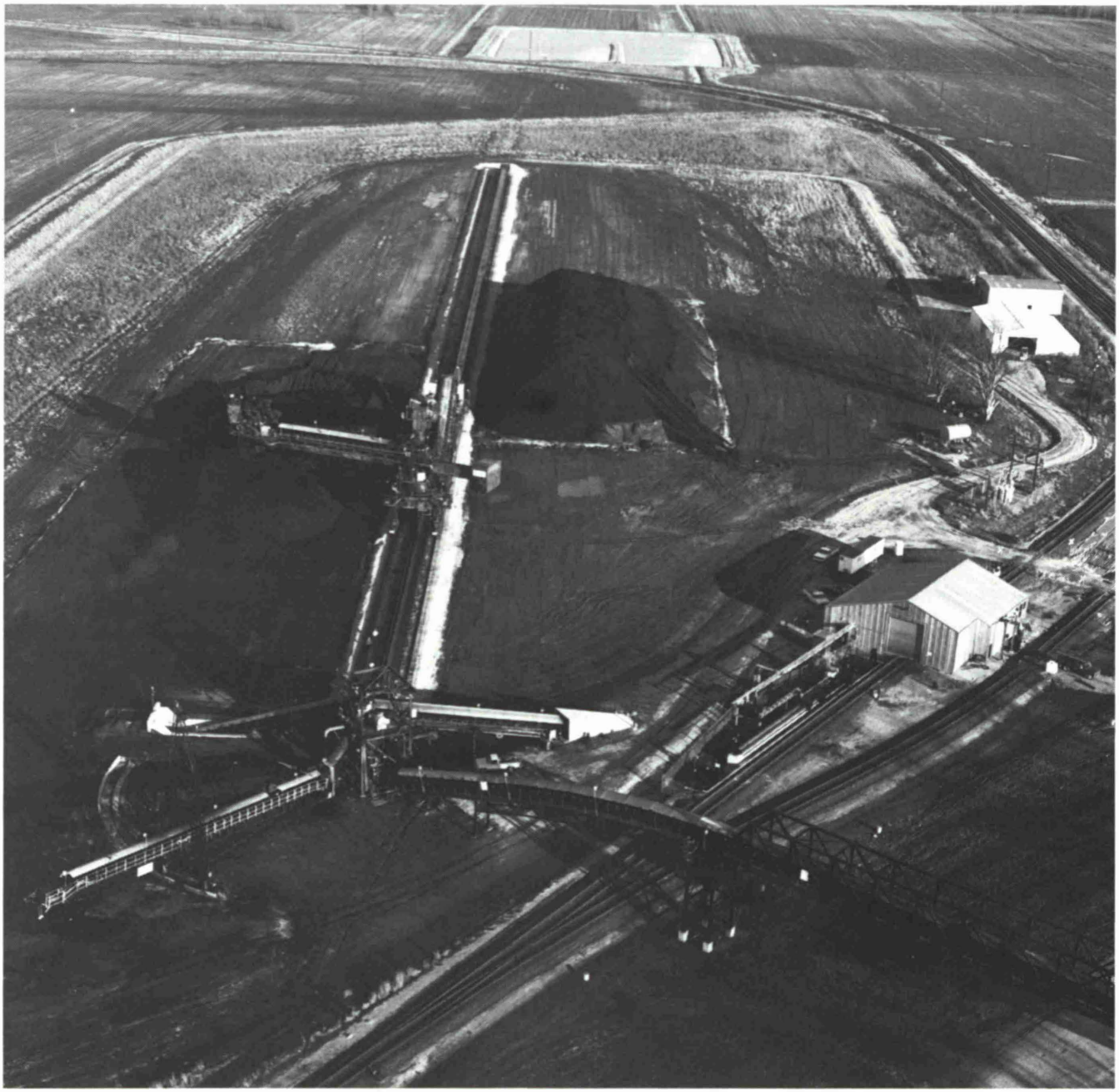

Fig. 14: An economical treating system can be phased to parallel the growth of the facility as shown at the IMT Plaquemines Terminal

- waters subject to the ebb and flow of the tide
- waterways used for interstate or foreign commerce
- nontidal waters.

The majority of Corps permits related to coal handling facilities are authorized under the following laws:

- Section 10 of the River and Harbor Act of 1899 which includes the construction of piers, bulkheads, filling and dredging
- Section 404 of Federal Water Pollution Control Act Amendments of 1972 and supplemented in the Clean Water Act of 1977 which regulates the discharge of dredged or fill material into water of the United States.

Because of the comprehensive environmental issues that must be considered, a Corps permit application should be filed as soon as the marine facilities layout is agreed upon. More often than not, this application requires the completion of an environmental questionnaire requiring substantial research, field and lab surveys and preliminary engineering. Some of the more common items which must be addressed include aquatic and terrestrial vegetation, fish and wildlife, population density and trends, archaeological and historical places, public health, regional development, water quality and secondary impacts.

When dredging is necessary for the development of a project, additional items such as characteristics and location of dredged disposal site, characteristics of the dredged material, and a dredging/disposal schedule must be provided to avoid degrading the water quality during fish migration.

In order for the Corps of Engineers to arrive at a decision on whether to issue a permit, concurrence or "No Objec-

tion Letters'' from other regulatory agencies are required. In Louisiana, for example, the Corps will not take final action on their permit until the ''No Objection Letter'' from the Coast Guard is secured. The Coast Guard will not reply until they review the comments from the waterway operators.

Generally, at the pre-application meeting and site visit the Corps of Engineers will state whether or not an Environmental Impact Statement (E.I.S.) will be required. Since completing an E.I.S. typically adds one year or more to the permit review period, the E.I.S. waiver is very important to the terminal development. It must be pointed out that the USEPA has equal authority to the Corps and could require an E.I.S. even if the Corps officially waives it.

The purpose of an E.I.S. is to provide the regulatory agencies with a basis on which to evaluate the probable impact of the proposed activity. An E.I.S. will include a description of the existing environmental setting of the site to provide a base-line of information to predict various impacts. Such items as aesthetics, conservation, economics, fish and wildlife, historic, land use, navigation, water supply and quality, wetlands, the general welfare of the public, etc., are addressed.

6. Local Permitting

Each city or county has a review committee to evaluate the probable impacts of the new facility on the community. A ''Preliminary Site Plan Approval'' is usually required when a proposed project has significant impact or when it affects the local general development plan. In general, local governing bodies can not issue building permits or licenses until this approval has been secured.

After approval of the review committee, the following three (3) major permits are required:

1. A ''Zoning Permit''. This permit is required to insure that the facility will conform to the land use specifications imposed by local zoning ordinances.
2. A ''Building Permit''. This permit is required prior to construction. Various public works officials such as the building inspector, electrical inspector, plumbing inspector, fire marshall, sanitation board, etc., will either ''sign-off'' the building permit and/or issue their own individual permit to allow the facility to be occupied.
3. A ''License to do Business''. This license gives the operator the right to do business. A method for measuring taxable revenue is usually incorporated within this license.

Acknowledgements

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[6] 40 CFR 50.7 — Secondary Standards for Ambient Air Quality

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[8] 40 CFR 423.42 — Best Practicable Control Technology Currently Available

[9] 40 CFR 423.43 — Best Available Technology Economically Achievable