

Crouse-Hinds Company, Syracuse, N.Y.

When in the course of human events it becomes necessary for one people to dissolve the political bands which have connected them with another, and to

John Hancock

stop. hope

William Allen.

CROUSE-HINDS COMPANY

SYRACUSE, NEW YORK 13201

D-9
IN
STORAGE

ROBERT K. McCABE
VICE PRESIDENT AND
GENERAL MANAGER
LIGHTING PRODUCTS DIVISION

April 26, 1976

Mr. Gerry D. Wagers
Regional Director
United States Department of the Interior
National Park Service
North Atlantic Regional Office
150 Causeway Street
Boston, Massachusetts 02114

Subject: Renovation of Statue Lighting, Statue of Liberty
National Monument (D50-DSC-TNE)

Dear Mr. Wagers:

I am pleased to submit this proposal for the relighting of the Statue of Liberty National Monument as a donation from the Crouse-Hinds Company.

Details of our proposal are contained in the pages that follow; however, I would first like to review for you how our interest in this matter evolved.

Our company only recently learned that the National Park Service project for the relighting of the Statue of Liberty would not be funded as part of our country's Bicentennial celebration. We had been closely involved in this project since early in 1974 when our personnel were called upon by the engineering firm of A. V. Colabella to supply technical support and sample floodlighting equipment for testing various lighting concepts.

We were pleased to see that our floodlights were specified for the statue lighting in the Comprehensive Design prepared under your Work-Directive 4-0002-74-2 and issued for review by the National Park Service in October of 1975. We were understandably proud to have the opportunity to be a part of this project, considering the unique significance of the Statue of Liberty as a symbol of freedom and its particular significance in the Bicentennial celebration. Crouse-Hinds has had a long history of

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participation in lighting many of our national monuments (Washington Monument, Mount Rushmore, The Lincoln Memorial, and the Thomas Jefferson Memorial), and we felt this project carried a special importance.

These facts are intended to explain our concern upon learning that the project was not approved for federal funding. The proposal submitted herein is a demonstration of the depth of our concern.

In extending its offer to donate all equipment and labor for relighting the Statue of Liberty, Crouse-Hinds is expressing its commitment to the original objectives of this project and our belief in the unique importance of the statue as a symbol of our country to native-born and foreign-born Americans and especially to visitors in this, our Bicentennial year.

Our engineers have reviewed the lighting design prepared under the previously referred to Work-Directive and endorse the proposed design. We believe the design will create an appropriate nighttime impact and utilize the maximum benefits of present lighting technology in terms of energy efficiency and operating economics.

Our proposal is outlined in further detail in the following pages and is being presented in person by representatives of our company at your offices on April 29.

The Crouse-Hinds Company has had considerable experience in working with the National Park Service, and we believe the installation of this lighting system will present few complications and can be accomplished in accordance with the time-tables shown.

We hope this proposal meets with your approval and that the necessary details can be resolved as soon as reasonably possible. It is our intention to have the installation completed as fast as we can. Clarification of the Crouse-Hinds Company's offer can be made by contacting my office or by contact with Mr. William Tuck at (315) 477-8230.

Mr. Gerry D. Wagers
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We appreciate the time and effort of your offices in consideration of this proposal and anxiously await your reply.

Sincerely,

A handwritten signature in dark ink, appearing to read "Robert K. McCabe", with a stylized flourish at the end.

Robert K. McCabe

RKM:bm
Attachment

cc: Mr. D. Galvin - NPS, Boston
Mr. R. Steenhagen - NPS, Denver
Mr. L. Kotecki, P.E. - NPS, Denver

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Crouse-Hinds' Proposal

The Crouse-Hinds Company of Syracuse, New York herein extends the following offer to the U.S. Department of the Interior, National Park Service.

The Crouse-Hinds Company will assume all equipment and labor costs to implement the relighting of the statue and pedestal portion of the specification prepared by A. V. Colabella under Work Directive 4-0002-74-02 (Renovation of the Statue Lighting, Statue of Liberty National Monument). Also encompassed in this offer is the cost of the labor and equipment to modify the lighting in the statue crown and torch (design proposal included herein).

The Crouse-Hinds Company will supply all equipment and will contract for installation. All costs incurred will be assumed by the Crouse-Hinds Company and are to be considered as a donation to the Government of the United States.

The equipment will be installed in accordance with the attached original specifications and the installation will be done under the supervision and/or general direction of the National Park Service. Minor changes or modifications will be made, as required, to ensure that the completed project meets with the approval of the National Park Service.

Project Coordination & Administration

The proposed project will be assigned a high priority by the Crouse-Hinds Lighting Products Division. All project activities will be under the direction of one of our key engineering managers, Mr. Robert H. Goodman, Manager of Customer and Product Engineering. (See Appendix for Mr. Goodman's resume.)

It is assumed that the National Park Service will provide a project supervisor who will interpret any questions regarding the specifications, obtain necessary clearances at the job site, approve completed work, and coordinate other key elements of the project deemed necessary by the National Park Service.

A competent installing contractor will be selected and paid by Crouse-Hinds Company.

It is proposed that a pre-construction bid conference be held at the bid site in order that Crouse-Hinds' selected contractor and project manager can establish a full understanding of the project construction plans with the appropriate National Park Service personnel.

All work elements will be subject to approval of the National Park Service and the project will be considered completed upon final approval of the Regional Director.

Design Specifications

As indicated, the Crouse-Hinds' proposal is based on providing the relighting of the statue and pedestal as specified in the Comprehensive Design prepared by the engineering firm of A. V. Colabella.

Pertinent portions of these specifications follow with Crouse-Hinds' interpretation and clarification provided where necessary.

This proposal also includes relighting of the torch and crown areas. Specifications and design rationale for this portion of the project are shown on pages 33 and 34.

Catalog data on floodlighting equipment is included in the proposal appendix.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
DENVER SERVICE CENTER
DENVER, COLORADO

RENOVATION OF
STATUE LIGHTING
STATUE OF LIBERTY NATIONAL MONUMENT
NEW YORK AND NEW JERSEY

Work Directive No. 4-0002-74-02
Basic Agreement No. CX-2000-4-0002
Project No. 4650-4766

A. V. Colabella, Engineers
Bordentown, New Jersey

FOR FINAL REVIEW

OCT 28 1975

PROJECT DATA SHEET

1. Name and Location of ProjectDescription title of work Renovation of Statue Lighting

Developed Area _____

Name of Park Statue of Liberty National MonumentCounty and State New York and New Jersey2. Reference: Project Number 4650-47663. Issuing Office

Title (SUPERINTENDENT OR DIRECTOR) _____

Office (PARK, REGION OR DSC) _____

Address (STREET OR BUILDING) _____

(CITY OR PARK, STATE, ZIP) _____

Telephone Number _____

4. Office Receiving Bids (WRITE "SAME" IF SAME AS ISSUING OFFICE) _____

Title (SUPERINTENDENT OR DIRECTOR) _____

Office (PARK, REGION OR DSC) _____

5. How many weeks for bidding time? Four

6. Time for Completion: _____ Calendar Days

7. Liquidated Damages: \$ 100 Per Day8. Contract Drawings: No. 356/41012, No. of Sheets 7

9. Number of copies required by Issuing Office: _____

10. Remarks and Special Instructions for Specification Section _____

DIVISION 1
SECTION 01010

GENERAL REQUIREMENTS
SUMMARY OF THE WORK

1. DESCRIPTION: The principal features of the work include replacing floodlights at base of Statue with new fixtures of different design, ~~and provision of security lighting.~~

2. LOCATION: Statue of Liberty National Monument, Statue of Liberty Island, New York.

3. ACCESS: Freight service via regularly scheduled ferry is available between Battery Park and Statue of Liberty Island. Docking facilities may also be made available for barge or other non-scheduled carrier.

There are no cranes or other mechanical unloading equipment for heavy items, and it will be the responsibility of the Contractor to provide any such facilities as may be required. Deliveries of any kind, and use of docking facilities at Liberty Island, shall be only by prior arrangement with the Unit Manager, Statue of Liberty National Monument, Liberty Island, New York, N.Y., 10004.

Every wooden barge shall be exterminated and certified rat-free before permission is granted to tie up at the Island. Steel barges do not require this treatment.

The extent of the area of operations including storage of materials and equipment will be designated by the Contracting Officer. The Contractor shall restore the area to its original condition upon completion of the work.

Contractor shall comply with all load restrictions in the hauling of materials on public roads beyond limits of the project. All movement of vehicular traffic in the project area shall meet with the approval of the Contracting Officer. A special permit will not relieve the Contractor of liability for damage which may result from the moving of equipment.

4. REFERENCE STANDARDS: The various sections of the specifications list standards, specifications, codes, etcetera, that govern the quality of materials and workmanship required. The Contractor shall have a copy of each of these reference standards available for use. "Latest addition" is the edition in effect 30 days prior to date of advertisement.

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5. LAYOUT OF WORK: All information for layout of the work is given in the drawings. The Contractor shall be responsible for all field measurements and layout. Positioning of all new construction, lighting equipment and controls shall be subject to field approval by the Contracting Officer before proceeding with the work. All errors in construction attributable to the Contractor's negligence or inaccuracy in properly locating any part of the work shall be corrected by him at his own expense. If any dimension line or data indicated on the drawings or located on the ground by the Contracting Officer appears to be incorrect to the Contractor he shall immediately notify the Contracting Officer of this fact.

Locations and elevations indicated on the drawings are subject to final adjustment by the Contracting Officer prior to construction. If adjustment is necessary, the Contractor shall cooperate with the Contracting Officer to facilitate prompt establishment of the field control for the altered or adjusted work.

In the case of "changes" or "differing site conditions" which involve any changes in stakeout, the Contractor shall cooperate with the Contracting Officer and facilitate the prompt establishment of the field control for altered or adjusted work.

6. PRE-CONSTRUCTION CONFERENCE: Before the work begins the Contracting Officer will arrange for a meeting with the Contractor to discuss the work in general, including administrative matters, National Park Service policy and regulations, safety and accident prevention, questions the Contractor may have, and points that need to be resolved before the work commences.

7. MAINTENANCE OF UTILITY SERVICES: Existing utility lines to be retained that are shown on the Drawings or the locations of which are made known to the Contractor by the Contracting Officer prior to excavation, as well as all utility lines uncovered during excavation operations shall be maintained and protected from damage during excavation and backfilling, and if damaged, shall be repaired by the Contractor, at his expense.

Interruption to existing utilities shall be at the convenience of the National Park Service only and shall occur during other than regular working hours of the activity

unless otherwise approved by the Contracting Officer. The Contractor shall submit notice, at least 48 hours in advance to the Contracting Officer prior to the proposed shut down.

8. COORDINATION: The Contractor shall coordinate his work schedule with the working hours of the National Park Service.

9. QUALIFICATION OF BIDDERS: To demonstrate his qualifications for the Project, each Bidder must be prepared to submit within five calendar days of the National Park Service's request written evidence of the types set forth in the Special Conditions, such as financial data, previous experience and evidence of authority to conduct business in the jurisdiction where the Project is located.

END

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SECTION 01300SUBMITTALS

1. SHOP DRAWINGS, PROJECT DATA AND SAMPLES:

A. Procedure for Submission: Submit 6 facsimilies of samples, shop drawings, catalog cuts, etcetera for review and approval, one of which will be returned when approved. Any extra copies submitted will be returned to the Contractor. The shop and diagram drawings and schedules must show completely all the work to be done, and any error or omission in the construction work because of incomplete or erroneous shop drawings, diagram drawings, and schedule shall be corrected by the Contractor at his own expense, even though the work is in place. Unless specifically requested as an exception by the Contractor and approved by the Contracting Officer in writing the approval by the Contracting Officer of any shop drawings, catalogs, schedule, sample, and related material is limited to general concurrence with the contract drawings and contract specifications, and such approval by the Contracting Officer will not relieve the Contractor of the responsibility for errors or failure to coordinate properly all elements of the project affected by the submittal material. All submittals shall be clearly identified on form DSC-1 (C.S).

Obtain approvals on all submittals before beginning fabrication or work on the affected items. It is the responsibility of the Contractor to present all such submittals at least two weeks in advance of his need for such approval. The Contracting Officer will entertain no request for a time extension to the Contractor resulting from a delay by the Contracting Officer in processing such submitted material unless the material is submitted in sufficient time to permit adequate review by the Contracting Officer commensurate with the complexity of the specific submittal.

B. Samples:

<u>SECTION</u>	<u>DESCRIPTION</u>
16530	Exterior Lighting Fixtures

C. Shop Drawings:

<u>SECTION</u>	<u>DESCRIPTION</u>
03306	Concrete Details

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<u>SECTION</u>	<u>DESCRIPTION</u>
05400	Metal Shield Fabrication
16010	Wiring Diagrams
16120	Conductors
16130	Cabinet and Interior Layout
16140	Switches and Receptacles
16180	Circuit Breakers
16530	Exterior Lighting Fixtures Hand Rails
16551	Lamps
16552	Ballasts and Accessories
16930	Contacts and Push Buttons

2. CERTIFICATION: When specified or requested by the Contracting Officer, the Contractor shall submit a certificate executed by the manufacturer certifying that the materials or equipment to be incorporated in the work comply with the requirements of these specifications.

3. SCHEDULING: Following receipt of the Notice to Proceed with the work, and prior to commencement of on-site operations, the Contractor shall submit to the Contracting Officer schedules of his proposed operation and progress, showing the Contractor's estimate starting and completion dates for each part of the work, in graphic form when required, and showing also the dollar value which the Contractor proposes to establish for each such element. Both the schedule of progress and the dollar value will be subject to review and modification by the Contracting Officer. When required by the Contracting Officer for the purpose of determining the equitableness of the Contractor's payment request, the Contractor shall furnish evidence satisfactory to the Contracting Officer of the sums paid by the Contractor for materials, supplies and other items of expense.

END

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SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

1. BARRICADES, DANGER, WARNING, AND DETOUR SIGNS: The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient red lights, warning and danger signals and signs, and take all necessary precautions for the protection of all floating equipment. The Contractor shall provide, erect, and maintain acceptable and adequate detour signs at all closures and along detour routes. All barricades and obstructions shall be illuminated at night, and all safety lights shall be kept burning from sunset until sunrise. All barricades and signs used by the Contractor shall be in accordance with the standard design, generally accepted for such purposes. Payment for all such services and materials shall be considered as included in other pay items on the Contract.

2. AIR AND WATER POLLUTION CONTROL:

A. The Contractor shall take all necessary reasonable measures to reduce air and water pollution by any material and equipment used during construction. Keep the site clean of trash and debris including loose construction materials, such as sand, cement, lime, wood pieces, etcetera. Place all trash and debris in approved containers and removed and disposed of off the site daily in a location where it will not reach any stream or be dispersed. No burning of trash or debris will be permitted on the site without prior written approval.

B. When excavations are made, immediately utilize resultant loose earth by filling and compacting in place, or dispose of it off the site.

C. The amount stated in the Contract shall cover and include all air and water pollution control.

3. SANITARY FACILITIES: The Contractor's employees shall be permitted to use the sanitary facilities provided for Park Service employees in accordance with the arrangements made with the Park Superintendent.

4. FIELD OFFICE: Provide at the project area a temporary field office for use by the Contracting Officer. The office shall contain a coat rack, chair, desk and table large enough

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to display drawings. If the Contractor elects to establish a temporary field office for his own use, this must be arranged with Park Superintendent and the Contracting Officer.

The Contractor shall furnish and maintain telephone service by radio with the mainland.

5. ARCHEOLOGICAL FINDINGS: A professional archeologist will be on site during the excavation process to prevent damage to known cultural resources and to assist in the recognition of any new resources which may be discovered, if deemed necessary by the Regional Director. The Contracting Officer and/or the archeologist shall have the responsibility and authority to halt any construction activities should historical, archeological, or paleontological resources be exposed. Construction activities endangering the resources will remain halted pending the investigation and evaluation of the remains, as well as the completion of the steps required by the Advisory Council's procedures.

END

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SECTION 01700

PROJECT CLOSEOUT

1. PROJECT RECORD DRAWINGS:

A. When the work is completed the Contractor shall provide the Contracting Officer with a set of project record drawings on clean prints of the original drawings. These drawings shall indicate in a neat and accurate manner all changes and revisions in the original design which affect the permanent structures and which exist in the completed work. All underground work shall be referenced to semi-permanent or permanent physical objects. Electric lines, etcetera, shall be referenced to actual corners of buildings.

B. The alterations and references shall be made with colored ink and shall be sufficiently clear and complete to enable reproducing these changes on the original tracings.

C. As-constructed conditions shall be kept current. They shall be inspected monthly for accuracy and completeness by the Contracting Officer. The Contractor shall certify on his monthly payments requisition that the drawings are accurate and complete.

D. All project record drawings shall be submitted before final payment for the completed work will be made.

2. FINAL INSPECTION AND ACCEPTANCE OF WORK. When all work of this Contract has been completed, including cleanup and restoration, the Contractor shall so notify the Contracting Officer in writing, and the Contracting Officer will then make final inspection. When defects, errors, and omissions disclosed by the final inspection have been corrected, acceptance will be given in writing; but until such acceptance, the Contractor will be responsible for the work covered by this Contract.

At the option of the Contracting Officer, acceptance may be given prior to the correction of such defects, errors and omissions which do not preclude the operation and use of the facility; however, in this event, final payment will be withheld until all corrections have been made.

3. CLEANUP: At the completion of the work, the Contractor shall remove all equipment, tools, and surplus materials,

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and shall completely clean the premises, removing and disposing of all debris and rubbish, and cleaning all stains, spots, marks, dirt, smears, etcetera. When work premises are turned over to the Government, they shall be thoroughly clean and ready for immediate use.

END

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DIVISION 2SITE WORKSECTION 02110DEMOLITION AND REMOVALPART 1: GENERAL

1-1 DESCRIPTION: The work of this section encompasses all demolition and removals required to complete the entire work of the Contract, including removal of existing floodlights at base of statue, and removal of wiring from outdoor panels to floodlights.

PART 2: MATERIALS

2-1 None required.

PART 3: EXECUTION

3-1 BARRICADES, SIGNS AND LANTERNS: Provide where required for all personnel that may reasonably be expected in the areas. Such protection shall be to the fullest practical extent and as such the Government shall have the option of requiring protection as deemed necessary.

3-2 REMOVALS: Removals shall be performed without damage to adjacent retained work. Where such work is necessarily or inadvertently damaged, the Contractor shall patch, repair or otherwise restore same to its original condition. The method, extent and location of removals, not specifically required otherwise shall be at the Contractor's option and shall be subject to approval.

3-3 SUPPORT: The contractor shall provide all temporary supports, shoring, etcetera as may be required to accomplish the work as indicated on the drawings.

3-4 DISMANTLING AND DISPOSAL: All items of removal shall be dismantled as required to fit through openings.

3-5 OPENINGS: All exterior openings formed by removals shall be temporarily closed in an approved manner to prevent the entrance of the elements.

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3-6 PENETRATIONS: Penetrations for mechanical and electrical utility runs shall be such that all evidence of removal work will be concealed by a cover plate.

3-7 CONDUIT: Except where shown otherwise, conduit shall be removed back to the first fitting in the portion to remain or to the plane of the first wall or similar construction through which it passes. Caps shall be provided for all conduit terminations.

3-8 WIRING: Remove back to the first component in the wiring system that is to remain. All electrical boxes (junction and switch) rendered unused by removals and that are to remain shall be provided with blank covers.

3-9 MECHANICAL AND ELECTRICAL SERVICES: Mechanical and electrical services to remain that are interrupted by removals shall be temporarily or permanently (as applicable) altered, capped, plugged or reset to suit the conditions with the least service interruption.

3-10 HOUSE-KEEPING: Cleaning, storage and disposal shall be performed on a daily basis. Debris shall be wetted down in the interim to prevent the creation of dust or a fire hazard.

PART 4: MEASUREMENT AND PAYMENT

4-1 MEASUREMENT: No separate measurement will be made for demolition and removal.

4-2 PAYMENT: No separate payment will be made for demolition and removal. Such work will be considered a subsidiary obligation of the Contractor under other items to which it relates.

END

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SECTION 02220EXCAVATION, BACKFILLING AND COMPACTIONPART 1: GENERAL

1-1 DESCRIPTION: The work of this section consists of providing all site excavation and backfilling as required to perform the entire work of the Contract complete and ready for use.

1-2 UNCLASSIFIED EXCAVATION: The excavation shall include the removal of all materials encountered in the area to be excavated. The excavation shall be made to depth required for the work noted on the contract drawings.

Excavation carried beyond the extent or depth required, without specific directions, shall be refilled to the proper grade with thoroughly compacted, suitable fill approved by the Contracting Officer. All additional work of this nature shall be at the Contractor's expense.

The Contractor shall be held responsible for correction of all damages to walks, paved surfaces and underground services encountered as a result of excavation made by him.

1-3 EXCESS MATERIAL: Excess material not suitable for backfilling or not required after the proper backfilling shall be legally disposed of off of the project site by the Contractor.

PART 2: MATERIALS

None required.

PART 3: EXECUTION

3-1 EXCAVATION: Excavation method in the vicinity of existing underground services, or underground structures which are known to lie in the path of excavation shall be by use of hand tools. In other locations the Contractor may use trench digging machinery or employ hand methods. Regardless of whether hand or machine methods are used the Contractor must perform all excavation with caution so that underground services and underground structures, known and unknown, are not damaged.

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3-2 BACKFILLING: The trenches shall be carefully back-filled with earth, loam, sandy clay, sand and gravel, soft shale or other approved materials, free from large clods of earth or stones over 2-1/2" maximum dimension, deposited in 6 inch layers and not more than 1 foot. The remainder of the backfill material shall then be carefully placed in the trench in 1 foot layers and tamped. Do not use frozen materials for backfill.

3-3 COMPACTION: The subbase for all sidewalks, concrete slabs for manholes, and for walkway patching shall be compacted by approved flat-faced mechanical tampers. Compaction of the subbase shall be 95% of the maximum density.

PART 4: MEASUREMENT AND PAYMENT

4-1 MEASUREMENT: No separate measurement will be made for excavation, backfilling and compaction.

4-2 PAYMENT: No separate payment will be paid for excavation, backfilling and compaction. It will be considered a subsidiary obligation of the Contractor under other items to which it relates.

END

SECTION 02822SEEDINGPART 1: GENERAL

1-1 DESCRIPTION: The work of this section consists of spreading topsoil over areas which were excavated and back-filled and the seeding of said areas.

PART 2: MATERIALS

2-1 TOPSOIL: Topsoil from stockpile or additional as may be required shall be free of all stones in excess of one inch in diameter and all rubbish.

2-2 SEED: All seed shall be of the following composition, Kentucky Bluegrass 80%, Domestic Ryegrass 10%, Red Top 10%. All seed to be furnished in standard containers and labeled in accordance with U. S. Department of Agriculture rules and regulations under the Federal Seed Act in effect and date of packaging of seed to be indicated on label.

2-3 LIME: Lime shall be ground limestone containing 85% carbonates of such size that 90% will pass a #20 sieve and 50% will pass a #100 sieve.

2-4 FERTILIZER: Delivered in bags or other convenient containers with name of material, manufacturer, net weight and analysis on each bag or container.

2-5 WATER: Water used for watering shall be free from oils, acids, alkali or salt which may impair grass growth.

2-6 MULCH: Mulch shall be low grade, musty, spoiled, partially rotted hay, straw, or other materials unfit for animal consumption. Mulch which contains detrimental seeds shall be rejected.

PART 3: EXECUTION

3-1 PREPARATION: Carry on work from time ground is workable in the spring to June 1st. Take full advantage of weather conditions. Apply limestone at the rate of 125 pounds per 1000 sq ft and fertilizer at a rate equivalent to 25 pounds of 10-10-10 analysis per 1000 sq ft. Work in to a depth of 3 to 4 inches.

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3-2 SOWING: Seed mixture to be sown uniformly with a mechanical distributor; sow at rate of 75 to 125 pounds per acre. Do not sow during windy weather or when ground is wet or otherwise untillable. Seed to be covered by stirring the ground not deeper than 1/4". When covering operation has been completed, roll again with a cultipacker and apply mulch at the rate of 70 to 90 pounds per 1000 sq ft.

3-3 MAINTENANCE: Maintain all seeded areas until the acceptance of the Contract. Areas which fail to show a "catch" or uniform stand for any reason whatsoever shall be reseeded until final acceptance. Damage resulting from erosion, wash-outs or other causes shall be repaired by filling with topsoil, refertilizing, reseeding by the Contractor at no additional expense to the Government.

PART 4: MEASUREMENT AND PAYMENT

4-1 No separate measurement and payment will be made for seeding work. It will be considered a subsidiary obligation of the Contractor under other pay items to which it relates.

END

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SECTION 03306

CONCRETE

PART 1: GENERAL

1-1 DESCRIPTION: The work of this section encompasses all concrete required to complete the entire work of the contract.

PART 2: MATERIAL

2-1 CEMENT: Portland cement free from lumps and other defects, FS SS-C-192, Type 1.

2-2 AGGREGATE: Free from oil, alkali, and organic matter or other deleterious substances. Aggregate may, at the option of the Contractor, consist of sand and gravel separately batched at the construction site, central batching plant, combined sand and gravel or pit run gravel. Aggregate shall be well graded in accordance with the following table:

Screen Size	#4 - 1/2" Gravel	#4 to 1"	Sand	Combined (or Pit-Run)
1-1-1/2"	94-100			95-100
1"		90-100		90-100
3/4"	35-70			60-80
1/2"		25-60		55-75
3/8"	10-30			45-60
# 4	0-5	0-10	95-100	40-50
# 16			45-80	15-30
# 30			25-55	10-20
# 40			5-30	2-10
# 100			0-10	0-4
# 200			0-5	0-2
	For use in Sections Greater than 6"	For use in Section 6" or under 6"		For use in any Section

2-3 WATER: Clean, fresh and free from injurious quantities of oil, acid, alkali, mineral and organic matter, or other deleterious substances.

2-4 REINFORCING STEEL BARS: Intermediate grade, billet steel, FS QQ-S-632 Type II, Class B40 free from rust, scale or oil.

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2-5 REINFORCING STEEL MESH: Welded steel fabric, ASTM A185, latest edition and shall be free from rust, scale or oil. Fabric shall be composed of steel wire conforming to FS RR-W-375.

2-6 STRENGTH: The concrete mix proportions shall be such as to produce a material having a compressive strength of not less than 3500 psi after a 28 day curing period.

PART 3: EXECUTION

3-1 FORMS: Steel, plywood or other suitable material; construct true to line and grade and sufficiently rigid to prevent deformation under load or vibration placement of concrete. Clean and oil forms before each placement of concrete.

3-2 REINFORCING STEEL: Thoroughly cleaned, properly placed and secured using metal chairs and spacers or other approved devices. Tie wire shall be 18 gage minimum black annealed wire. Place reinforcement accurately according to the drawing or as directed.

3-3 PROPORTIONING AND CONTROL: Concrete shall contain no less than six 94-pound sacks (1-1/2 barrels) or cement per cubic yard of concrete. Maximum allowable net water content (including water in aggregate) shall be 6-1/2 gallons of water per sack of cement. Consistency may be determined in the field by a slump test in accordance with ASTM C143, latest edition. Slump for vibrated concrete shall be 2 to 4 inches and for nonvibrated concrete 2 to 5 inches.

3-4 MIXING: Mix cement, aggregate and water in an approved mechanical mixer for a period of not less than 1-1/2 minutes before concrete placement. For very small quantities, hand mixing may be permitted upon approval of the Contracting Officer. The entire contents of the mixer shall be removed from the drum before materials for a succeeding batch are placed therein. Mix concrete only in quantities required for immediate use. Retempering of concrete will not be permitted.

3-5 PLACING: Place all concrete within 30 minutes after mixing. Handle concrete as little as possible. Do not drop freely more than 5 feet. Concrete shall be thoroughly tamped or vibrated after being placed in the forms.

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3-6 FORMS: Do not remove forms until permission has been granted by the Contracting Officer and in no case less than 12 hours. Selection of time will depend upon weather conditions.

3-7 CURING: Prevent rapid drying by covering all exposed surfaces with Kraft paper, mats, earth, wet burlap, or an approved membrane curing compound for at least 7 days.

3-8 PROTECTION FROM FREEZING: After placing in the forms, maintain the concrete at a temperature of 50°F. for a period of 72 hours and at a temperature above 32° for an additional period of 3 days.

PART 4: MEASUREMENT AND PAYMENT

4-1 No separate measurement will be made for concrete.

4-2 PAYMENT: No separate payment will be made for concrete. It will be considered a subsidiary obligation of the Contractor under other items to which it relates.

END

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3 of 3

DIVISION 16ELECTRICALSECTION 16010GENERAL PROVISIONSPART 1: GENERAL

1-1 DESCRIPTION: The work of this section includes the furnishing and installation of a new flood lighting system for the Statue of Liberty. ~~Additional security lighting fixtures at the base of the Statue, the main entrance and the outside stairs shall be provided.~~

1-2 RELATED WORK: This includes the removal of existing floodlights and associated conduit and wiring.

1-3 DISPOSAL OF REMOVED EQUIPMENT: Equipment removed shall be placed at a location on the island as directed by the Contracting Officer.

PART 2: MATERIALS

2-1 MATERIALS: Materials for this Section are as specified elsewhere and shown on the plans.

PART 3: EXECUTION

3-1 FLOODLIGHTS: Floodlights are to be mounted as shown on the plans and wired to existing circuits.

~~3-2 SECURITY LIGHTING: These lighting fixtures are to be on grade to illuminate areas indicated on the drawing. New circuits and controls are to be provided.~~

~~3-3 FLUORESCENT LIGHTING: Main entrance and exterior stairway lighting fixtures shall be mounted and connected as shown in the drawing.~~

PART 4: MEASUREMENT AND PAYMENT

4-1 MEASUREMENT: Measurement of this will be by comparison of work performed with that called for in contract documents.

4-2 PAYMENT: Payment will be by lump sum for furnishing and installing electrical equipment and all associated work.

END

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16010
1 of 1

SECTION 16120CONDUCTORSPART 1: GENERAL

1-1 DESCRIPTION: The work of this section consists of furnishing and installing conductors in conduit raceways and by direct burial.

1-2 MATERIAL HANDLING: Care shall be required during installation to avoid damage to insulation.

PART 2: MATERIALS

2-1 GENERAL REQUIREMENTS: Unless otherwise indicated, all conductors shall be type THW, 600 volt rating. Sizes shown or specified are American Wire Gauge and are for copper conductors; if aluminum is substituted, sizes shall be such as to give equivalent ampacity. No conductor shall be smaller than No.12 unless so indicated.

PART 3: EXECUTION

3-1 WIRE INSTALLATION: All main and branch circuit wiring shall be run in steel conduit, conforming to National Electrical Code, latest edition. Splices in conductors No.8 and larger shall be made with the approved solderless connectors, then covered neatly with an insulation tape having insulation value equivalent to the conductor insulation. Wire smaller than No.8 shall be twisted, Wire nuts are acceptable. All aluminum wire connections shall be made with approved connectors and under close quality control and inspection.

3-2 UNDERGROUND: Direct burial cable shall have a minimum of 24 inches of cover. The bottom of the trench for direct-burial cables shall be smooth and free of stone and other sharp objects. Where bottom of trench comprises materials other than sand or earth, a 3 inch layer of sand or stone-free earth shall be laid on the bottom of the trench and compacted to the approximate density of the surrounding firm soil. The cable shall be unreeled in place along the side of or in the trench and carefully placed on the sand or earth bottom. Pulling the cable into the trench from a fixed reel position will not be permitted. In no case shall cable be left under longitudinal tension. The first layer of back-fill shall be sand or stone-free earth.

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1 of 2

3-3 SPLICES: Direct burial cable splices shall be made in strict accordance with the cable manufacturer's recommendations.

PART 4: MEASUREMENT AND PAYMENT

4-1 MEASUREMENT: No separate measurement will be made for this work.

4-2 PAYMENT: Payment will be included in lump sum for furnishing and installing electrical equipment.

END

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2 of 2

SECTION 16130OUTLET BOXESPART 1: GENERAL

1-1 DESCRIPTION: The work of this section consists of installing junction and pull boxes in connection with conduit and raceways.

1-2 SIZE: Size of junction or pull box shall conform to requirements of National Electric Code, latest edition.

PART 2: MATERIALS

2-1 JUNCTION AND PULL BOXES shall be made of 16 gauge galvanized sheet steel. Box shall include a screwed cover.

PART 3: EXECUTION:

3-1 THE JUNCTION OR PULL BOX shall be fastened to wall with screws or brackets. Each conduit shall have locknuts and bushings securely fastened.

PART 4: MEASUREMENT AND PAYMENT

4-1 MEASUREMENT: No separate measurement will be made for this work.

4-2 PAYMENT: Payment will be included in the lump sum payment for furnishing and installing electrical equipment.

END

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1 of 1

SECTION 16450GROUNDINGPART 1: GENERAL

1-1 DESCRIPTION: This section covers the general requirements for grounding and bonding of the electrical installation.

PART 2: MATERIALS

2-1 MATERIALS: The grounding conductor, bond or bonding jumper shall be attached to circuits, cabinets, equipment and the like which are to be grounded by:

- (1) Suitable Lugs
- (2) Pressure Connector
- (3) Clamps

2-2 CONDUCTOR: Grounding conductors shall be copper with green insulation.

2-3 RODS: Ground rods shall be Copperweld 10 ft x 3/4 inch.

PART 3: EXECUTION

3-1 WORK: Ground conductor shall be firmly connected to water pipe ground or driven ground, whichever is required to comply with National Electric Code, latest edition. All lighting fixtures shall be grounded.

PART 4: MEASUREMENT AND PAYMENT

4-1 MEASUREMENT: No separate measurement will be made for this work.

4-2 PAYMENT: No separate payment will be made for grounding. It will be considered a subsidiary item under other items to which it relates.

END

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1 of 1

SECTION 16530

EXTERIOR LIGHTING FIXTURES

PART 1: GENERAL

1-1 DESCRIPTION: The work of this section consists of furnishing and installing the following new lighting fixtures at the Statue of Liberty:

- A. Floodlights for Statue.
- B. Floodlights for base of the Statue.
- ~~C. Security Floodlights on ground around base of Statue.~~
- ~~D. Fluorescent lighting over main entrance doors.~~
- ~~E. Handrail lighting on outside stairs.~~

PART 2: MATERIALS

2-1 FLOODLIGHTS: All floodlights shall be UL listed for marine floodlight service in accordance with Standard 595 and shall be complete with all necessary brackets and hardware for mounting and for horizontal and vertical angle adjustment. Types and beam angles shall be as follows:

- A. Statue lighting: Floodlights shall be ¹⁰⁰⁰ ~~100~~ watt metal halide type with external ballasts, NEMA 2 beam (26° x 26°) Crouse-Hinds Model ADE-16, Cat. No. 43070, modified.
- B. Base lighting: Shall have NEMA 3 beam spread (45° x 45°) and shall be of two types as indicated on the plans; 1000 watt metal halide type with external ballast, Crouse-Hinds Model ADE-16, Cat. No. 48112, and 400 watt high pressure sodium type, Crouse-Hinds Model ADE-14, Cat. No. 48305.

~~C. Security lighting: shall be 500 watt, 120 volt incandescent type, NEMA beam spread 30° horizontal by 32° vertical, Crouse-Hinds Model ADE-14, Cat. No. 48049 special.~~

~~2-2 ENTRANCE LIGHTING: Furnish three fixtures for the three entrance doorways, with aluminum side covers fabricated to fit the doorways and anodized in color to match the existing doors. Basic fixture shall be Day-Brite vandal-resistant Daylume, 2-lamp, 40 watt with depth and width not more than 3-1/4 inches by 12 inches and length to fill the door opening of approximately 6 feet, 6 inches.~~

~~2-3 HANDRAIL LIGHTING: Provide wall-mounted fluorescent illuminated handrails as shown on the drawings, with remote~~

~~ballasts and switching from the lobby below. Railing shall be type WPL-200 LUMI-RAIL SERIES as manufactured by Devco Lighting Corporation.~~

PART 3: EXECUTION

3-1 INSTALLATION: ~~Mount security floodlights on new concrete bases with covers and drainage provisions as shown on the drawings.~~ Mount floodlights for statue and base on existing low-set horizontal bars made of galvanized steel conduit. When removing existing fixtures and wiring from these bars, seal all holes in bars temporarily with tape. Mount new fixtures on bars, remove temporary seals, and provide permanent waterproof plugs or seals for all unused holes. Leave all conduit assemblies clean, dry and well sealed against moisture.

3-2 WIRING: Existing circuits shall be used to supply new lighting fixtures as shown on the drawings. For statue and pedestal floodlights, install new wiring from existing outdoor panels at eleven locations indicated. ~~For security floodlights and new fluorescent fixtures, install new wiring from panel in transformer and switchgear room.~~

3-3 CONTROLS: Remote controls shall be installed as shown on drawing and described elsewhere in these specifications. Photoelectric and timing controls are existing.

PART 4: MEASUREMENT AND PAYMENT

4-1 MEASUREMENT: No separate measurement will be made for exterior lighting fixtures.

4-2 PAYMENT: Payment for this will be included in the lump sum for furnishing and installing electrical equipment.

END

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2 of 2

SECTION 16551LAMPSPART 1: GENERAL

1-1 DESCRIPTION: The work of this section consists of providing new lamps to be installed in the new fixtures.

PART 2: MATERIALS

2-1 LAMPS:

A. Lamps for floodlights requiring 1000 watt metal halide lamps shall be clear for use with 120 volt ballasts. Lamps shall be GE No.MV1000/BD.

B. Lamps for floodlights requiring 400 watt high pressure sodium lamps shall be clear for use with 120 volt ballasts. Lamps shall be GE No.LU 400/BD.

~~C. Lamps for security floodlights shall be 500 watt incandescent, 120 volt, Mogul base, clear, GE No.500.~~

~~D. Fluorescent lamps for entrance door fixtures shall be GE No.F40CW for 120 volt operation.~~

~~E. Lamps for railing fixtures shall be fluorescent rapid start, wattage, length and type required by manufacturer of the railing, for 120 volt operation.~~

PART 3: EXECUTION

3-1 INSTALLATION: All lamps shall be securely installed in accordance with manufacturers instructions.

PART 4: MEASUREMENT AND PAYMENT

4-1 MEASUREMENT: No separate measurement will be made for lamps.

4-2 PAYMENT: Payment will be included in lump sum for furnishing and installing electrical equipment.

END

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1 of 1

SECTION 16552BALLASTS AND ACCESSORIESPART 1: GENERAL

1-1 DESCRIPTION: The work of this section consists of furnishing and installing ballasts and accessories for high pressure sodium, metal halide ~~and fluorescent~~ lamps.

PART 2: MATERIALS

2-1 GENERAL: All ballasts shall be for 120 volt operation. Ballasts mounted outside shall be protected by a weatherproof aluminum cover.

2-2 MOUNTING:

A. Floodlights mounted outdoors and requiring a separate ballast shall have the ballast mounted on a plate or bracket adjacent to the trunion of the floodlight it serves.

~~B. Remote ballasts for handrail fluorescent lighting shall be installed indoors in such a manner that heat will dissipate rapidly and where the temperature will never exceed 90°F.~~

~~2-3 STARTING: Fluorescent lighting ballasts shall be high power factor, rapid start, internally thermally protected, and selected for satisfactory operation at temperature down to -20°F.~~

PART 3: EXECUTION

3-1 FASTENING: All ballasts shall be securely fastened. Connections shall be permanently made and insulation restored to original value.

PART 4: MEASUREMENT AND PAYMENT

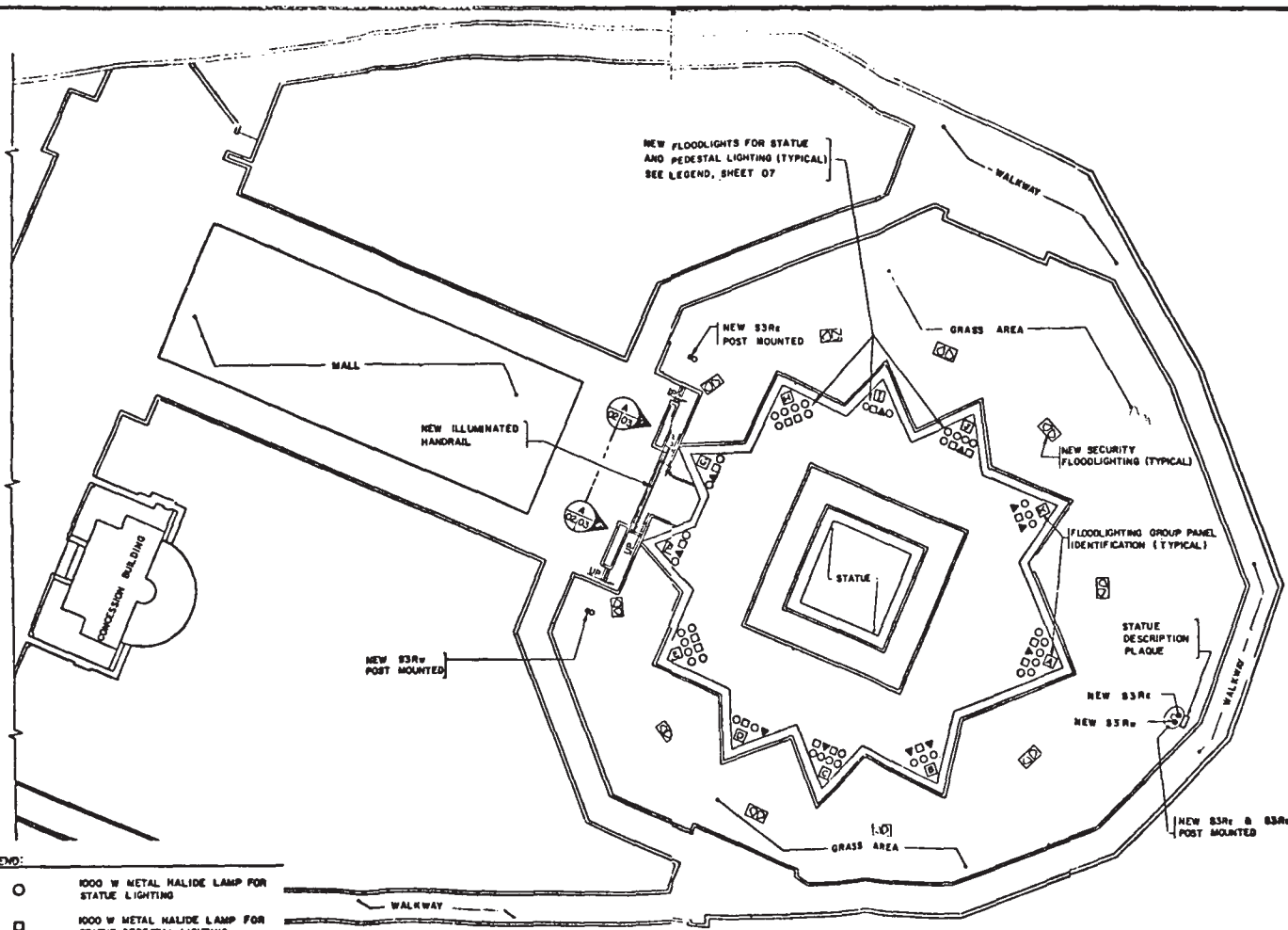
4-1 MEASUREMENT: No special measurement will be made for this work.

4-2 PAYMENT: Payment will be included in the lump sum payment for furnishing and installing electrical equipment.

END

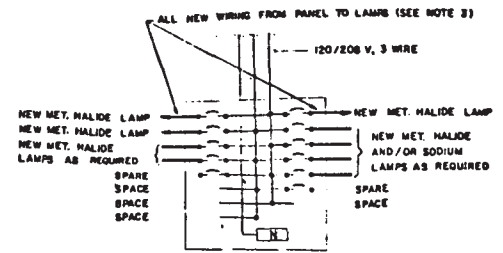
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1 of 1



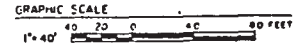
- LEGEND:**
- 1000 W METAL HALIDE LAMP FOR STATUE LIGHTING
 - 1000 W METAL HALIDE LAMP FOR STATUE PEDESTAL LIGHTING
 - ▼ 400 W SODIUM LAMP FOR STATUE PEDESTAL LIGHTING

STATUE FLOODLIGHTING PLAN
SCALE - 1" = 40'



TYPICAL FLOODLIGHTING PANELS A THRU K
NO SCALE

- NOTES**
1. UNLESS INDICATED AS "NEW", CONDITIONS SHOWN ON THIS SHEET ARE EXISTING.
 2. 83R PUSH BUTTON STATION MOUNTING POST DETAIL IS SHOWN ON SHEET 5. EXACT LOCATION TO BE DETERMINED IN THE FIELD.
 3. STATUE LIGHTING CIRCUITS AND PEDESTAL LIGHTING CIRCUITS SHALL BE ON OPPOSITE SIDES IN PANEL INsofar AS PRACTICABLE.



FOR FINAL REVIEW

OCT 28 1975

A. V. COLABELLA, ENGINEERS 138 PARKSWORTH AVENUE BORDENTOWN, NEW JERSEY ENGINEER'S FILE NO. 73-814	STATUE FLOODLIGHTING PLAN, AND ELECTRICAL SCHEMATIC DIAGRAM		PREPARED BY: JMM CHECKED BY: JMM DATE: JUL 1975	DRAWING NO. 356 41018
	RENOVATION OF STATUE LIGHTING STATUE OF LIBERTY NATIONAL MONUMENT			
	NORTHEAST REGION	HUDSON COUNTY	NEW JERSEY STATE	CHECKED BY: JMM DATE: JUL 1975

Crown and Torch Lighting

At the windowed observation platform at the Statue of Liberty's Crown there are now installed eleven 100-watt incandescent lamps to simulate a jewel-like appearance at night.

We propose to replace these by eleven 100-watt clear mercury lamps in enclosing globes (see VMVC2A100 GP on catalog page 3L2). The benefit of the mercury over the incandescent is three-fold:

- 1) Light output would be more than doubled
- 2) Clear mercury has a distinct bluish cast and will simulate the appearance of a jewel much greater than would the incandescent lamp with its warmer, reddish-orange output.
- 3) Life is 24000 hours vs. 750 for incandescent.

The torch is presently lighted by three 500-watt self-ballasted mercury lamps. We propose to replace these by three ADE-14 floodlights similar to those for the statue and pedestal. 400-watt, high pressure sodium lamps would be used. Here again the benefit would be three-fold:

- 1) Light output would be increased by 5 times.
- 2) H.P.S. lamps have a distinctive yellow cast more indicative of a flame.
- 3) Life would be increased to 20000 hours.

Material to be Supplied by Crouse-Hinds

- 58 - ADE-16 floodlights
- 14 - ADE-14 floodlights
- 11 - VMVC fixtures (incl. ballast)
- 58 - 1000 watt, metal halide lamps
- 14 - 400-watt, high pressure sodium lamps
- 11 - 100-watt, clear mercury lamps
- 58 - 1000-watt, metal halide ballasts
- 14 - 400-watt, high pressure sodium ballasts

As req'd. - Conduit, fittings, wiring

Project Schedule

Subject to other work activities planned by the National Park Service at Liberty Island, a tentative project work schedule has been developed.

Key phases of the project are shown below and in the milestone chart on the following page:

National Park Service Approval of Crouse-Hinds' Proposal	May 10, 1976
Crouse-Hinds Contractor Named	May 11, 1976
Pre-construction Conference at Liberty Island	May 14, 1976
Removal of Existing Floodlights Completed	May 21, 1976
Begin Installation of New Floodlights	May 24, 1976
Complete Installation of New Floodlights	June 4, 1976
Review Aiming of Floodlights	June 7, 1976
Complete Installation of New Lights in Torch and Crown	June 13, 1976
Final Aiming and Adjustment	June 14, 1976
Completion of Restoration of Site Area	June 21, 1976
Final Review by National Park Service	June 25, 1976

PROJECT MILESTONE CHARTSTATUE OF LIBERTY LIGHTING

Wk. Ending	5/2	9	16	23	30	6/6	13	20	27	7/4
Crouse-Hinds proposal submitted to Nat. Park Service	▽ 4/29									
National Park Service Approval of Crouse-Hinds Proposal			▽ 5/10							
Crouse-Hinds Engineering Issue to Manufacturing			▽ 5/10							
Crouse-Hinds Manufacturing Procurement and Production			▽ 5/10	5/21 △						
Crouse-Hinds Contractor Named			▽ 5/11							
Pre-construction Conference at Liberty Island			▽ 5/14							
Contractor remove existing floodlights			▽ 5/14	5/21 △						
Crouse-Hinds Shipment of floodlights, lamps, ballasts				▽ 5/21						
Contractor installation of new lighting equipment for statue and pedestal					▽ 5/24		6/11 △			
Review aiming of lights with engineer							▽ 6/7			
Contractor installation of crown and torch lights					▽ 5/28		6/11 △			
Final aiming and adjustment								▽ 6/14		
Contractor complete restoration of site			▽ 5/14						6/21 △	
Final review by National Park Service									▽ 6/25	

4/28/76

Limits of Proposal

This proposal does not encompass that portion of the total renovation design concerned with the security lighting of the grounds, stairways, and entrance doors.

The Crouse-Hinds Company has carefully evaluated these aspects of the renovation and at this time has elected not to participate in this portion of the project. Our rationale for this decision is as follows:

Our primary interest is that the statue be seen at night as soon as possible and we believe that if the security lighting were included, the project would take over twice as long to complete.

We believe that there are alternative designs which could accomplish the security lighting objectives at one-third to one-fourth the cost of the present design. Crouse-Hinds ~~is prepared to assist~~ ^{will} in developing these alternate designs/ and would ~~consider donating~~ the labor and equipment for a lower-cost design. However, we believe that this portion of the project should be considered at a separate time. We also feel it would be advisable to consider alternate security lighting designs after the statue and pedestal relighting is completed. It is conceivable that reflection and spill light from the statue lighting will provide some security lighting around the base.

The products involved for the handrail and vandal-resistant entranceway lighting are not within Crouse-Hinds' current product scope.

CROUSE-HINDS COMPANY
LIGHTING PRODUCTS DIVISION
PRODUCT SCOPE AND APPLICATIONS

Introduction to the Crouse-Hinds Lighting Products Division

Crouse-Hinds has provided heavy-duty industrial and special purpose lighting, including aviation ground lighting for more than fifty years. In the past ten years, a rapid expansion of sales and facilities has taken place in Crouse-Hinds Company's lighting business, with the result that in 1970 a separate division was formed, with a separate management and undivided responsibility for the design, manufacture, and sale of the products listed below.

Product Scope

- Industrial, Commercial, and Institutional Outdoor Lighting
- Aviation Ground and Navigation Lighting
- Indoor Commercial and Institutional Lighting
- Indoor Industrial Lighting (except for hazardous environment, which is within the scope of the Construction Materials Products Division)

Major Product Line Applications

Our product lines include fixtures and related equipment for a wide variety of applications outdoor and indoor. Light sources used include: incandescent, tungsten halogen, fluorescent, mercury vapor, metal halide, and high pressure sodium lamps.

Serving Markets Everywhere

Our products are specified and purchased for installation throughout the United States and in many areas of the world. Crouse-Hinds is widely experienced in providing the most appropriate packing and palletizing, handling of transportation details, scheduling of shipments, and similar variables required for different products and different geographical areas.

Leadership in Innovation

As an independent lighting manufacturer not related to any lamp company, Crouse-Hinds is in a unique position to provide product innovation based on objective analysis of new developments in lamp/ballast systems.

This ability has resulted in a flood of new Crouse-Hinds products, which have been largely responsible for our rapid growth.

Innovation takes many forms. We list here a few examples of our innovative abilities to indicate that should you decide to involve Crouse-Hinds further on this project, the same people and facilities which produced these successful innovations will be available to you.

Examples of Crouse-Hinds Innovation

- First metallic vapor floodlight
- First single-ended quartz floodlight
- First enclosed and gasketed mercury vapor industrial fixture line
- First metal halide sign-lighting system
- First explosion-proof quartz and incandescent floodlights
- First computer-produced lighting measurement system for color-TV vertical footcandle requirements
- First successful asymmetric reflector closed floodlight
- First designed-integrated total line of outdoor lighting fixtures
- First mixed-light-source large area luminaire
- First hinged lighting pole line
- First controlled vertical wide-beam industrial floodlight
- First explosion-proof mercury vapor floodlight with integral ballast
- First cut-off luminaire designed exclusively for high pressure sodium lamps
- First all-fiberglass area lighting luminaires



Shipping Area at Liverpool Lighting Plant

Niles, Illinois

Located in a key industrial area near Chicago, our Niles plant also is designed specifically to manufacture lighting products. Crouse-Hinds acquired this facility in 1966 when it purchased the Revere Electric Manufacturing Company.



Niles, Ill. Lighting Plant

The Niles plant includes facilities both for the manufacture of lighting fixtures and lighting poles. Because of the varied nature of the products regularly manufactured there, the Niles facility provides an unusual degree of manufacturing and assembly flexibility for special product requirements. Recently, for example, this plant tooled up and produced more than 6000 special new fixtures and related equipment, all in a period of only 5 months.

Multiple Plant Advantages

Multiple plant operation gives Crouse-Hinds the necessary manufacturing flexibility to fully meet customers varied requirements. By providing strategic geographical locations with a full range of manufacturing techniques, products of the highest quality are manufactured on-time at competitive prices.

MANUFACTURING AND DELIVERY CAPABILITIES

The magnitude of any large complex project places a premium on supplier understanding of modern construction scheduling techniques. Scheduling devices such as PERT or CPM make it mandatory that extraordinary attention is given to installation procedures, packaging requirements, product quality control, delivery, and a host of other critical details.

Crouse-Hinds Company's long experience with such projects provides us with a full understanding of our role in supplying lighting products when and as required. Our facilities and organization are carefully designed to meet such needs.

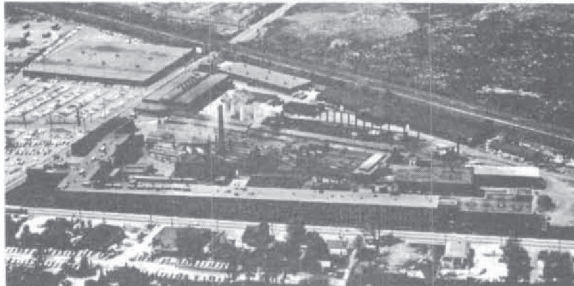
Plant Facilities

Crouse-Hinds Company manufactures its lighting products in three plants:

- (1) A 900,000 square foot plant in Syracuse, New York
- (2) A 120,000 square foot plant in Liverpool, New York
- (3) A 110,000 square foot plant in Niles, Illinois

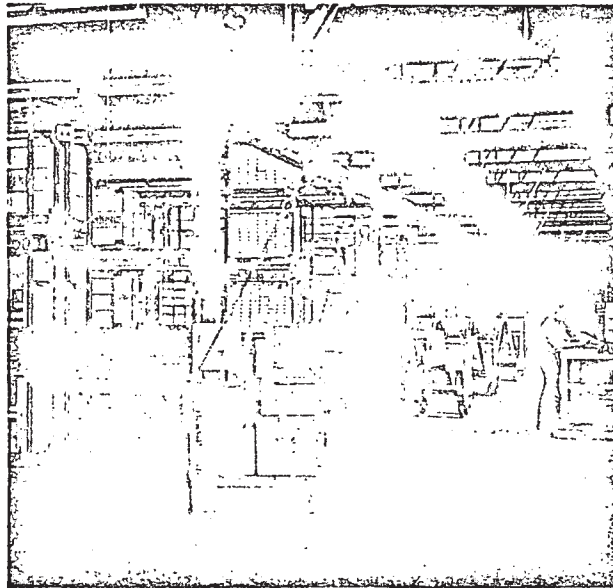
Syracuse, New York

Our Syracuse plant includes major facilities for ferrous and non-ferrous casting, heavy and light machining, sheet metal fabrication, plating and painting, assembly, warehousing, and shipping.



Syracuse, N.Y. Main Office and Plant

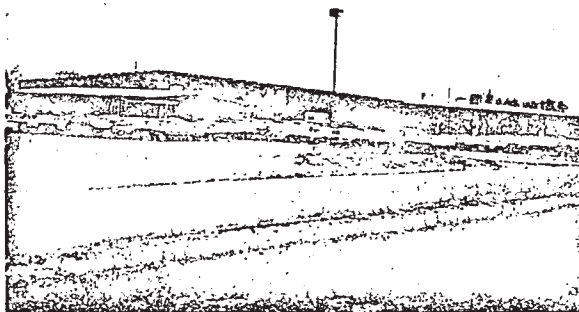
Our highly automated reflector spinning and forming departments, extensive high-production plating and painting equipment, and large modern non-ferrous foundry are of particular interest to lighting product users, especially since Crouse-Hinds fabricates approximately 80 percent of the components used in our lighting products.



Warehouse Facility at the Syracuse Plant

Liverpool, New York

The ultra-modern lighting plant in Liverpool, New York is wholly devoted to the manufacture, assembly, and shipment of Crouse-Hinds lighting products. The facility opened for production in 1968 and is designed especially for the efficient manufacture of lighting fixtures.



Liverpool Lighting Plant

It features advanced manufacturing techniques such as automated cleaning and painting equipment, conveyorized assembly operation, and beading machines for installing the glass into lighting fixtures. This facility has its own industrial engineering group, test laboratories, production control, accounting, and purchasing. This provides it with the flexibility to not only manufacture lighting equipment in the shortest possible time but to modify this equipment at any time during the assembly operation.

ROBERT H. GOODMAN

Graduate of the Pennsylvania State University with
B.S. degree in Electrical Engineering

With Crouse-Hinds Company:

Various positions since 1939 in Sales, Marketing
and Application Engineering. Currently Manager,
Product and Customer Engineering, Lighting Products
Division.

Industry Activities:

Illuminating Engineering Society (IES)

Member (since 1946)

Past Chairman, Central New York Section (1954-55)

Technical Committees:

Sports & Recreational Areas (Chairman 1973-74)

Outdoor Productive Areas (Past Chairman)

Service Station & Parking Areas

Airport Service Areas

Computer

Energy Budgeting Procedures

Has presented papers at local Section meetings,
Regional conferences and Annual Conference.

Has written articles for L.D. & A. and other industry
magazines.

National Electrical Manufacturer's Association (NEMA)

Member of Floodlighting Section Technical Committee
from 1960-1969 - Chairman 1960-1964

Traffic Committee, Industrial/Commercial Lighting
Section.

Design Considerations

for

MONUMENT FLOODLIGHTING

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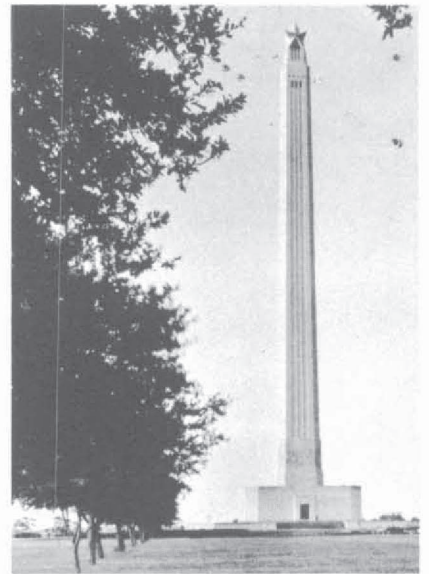
CROUSE-HINDS COMPANY, Syracuse New York

Design Considerations for **MONUMENT FLOODLIGHTING**

The toughest floodlighting jobs
can often be done easily
through the practical approach.



AT NIGHT tower glistens even more brightly against sky by contrast than during day, as searchlights and floodlights dramatically accent the vertical shaft.



SAN JACINTO MEMORIAL, Pasadena, Texas, towers 570 ft above historic battleground and glistens in bright sunlight. Structure at base of tower is a museum.

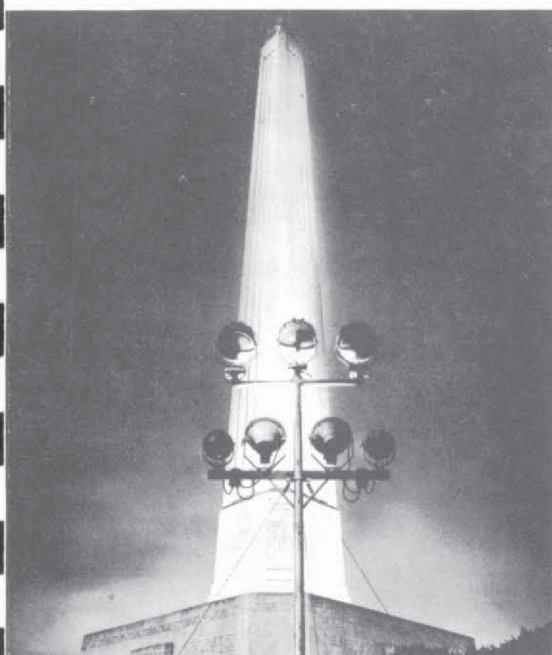
THERE are three practical considerations that electrical contractors always find themselves accountable for when called upon to floodlight monuments, statuary, or public shrines: (1) locating the floodlight units as obscurely as possible; (2) achieving proper illumination intensities; and (3) selecting equipment that best suits the job.

The first consideration, laying out the floodlights inconspicuously, meets the esthetic requirements for the monument site. Light beams must always appear part of the monument; and only when the sources of light are unnoticeable is this effect fulfilled.

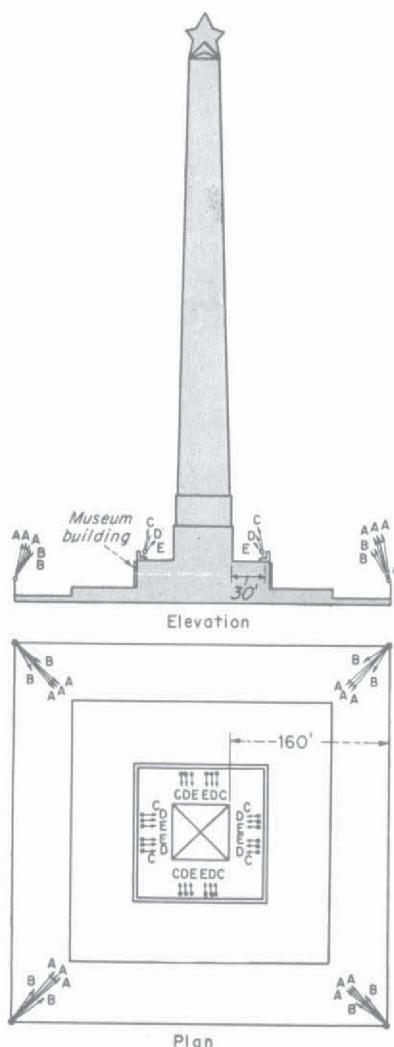
The second consideration, proper illumination intensities, means focusing light in precise amounts on those parts of the monument that will make them appear as natural as they are in broad daylight.

To secure adequate performance from monument floodlighting, care should be taken that the equipment is earmarked for the job it is expected to do; it should be well-built, capable of years of nightly service. Though obscurely located, the floodlight units should be easily accessible for cleaning or relamping. If mounted out-of-doors, they must withstand severe changes in temperature and damage from water or dirt.

Unlike the multitudinous floodlights of most building or sports arena lighting systems, monument floodlighting calls for few units—



POLE MOUNTED floodlights at each of four corners of base project light to shaft, and have proper light distribution to bathe shaft in even illumination.



LOCATION AND TYPE of floodlights are shown on the plan and elevation of the San Jacinto Memorial, above.

usually searchlights or a combination of searchlights and floodlights. Ideal for monument floodlighting, the searchlight accurately pinpoints a bright patch of light over a long distance and still meets the standards for attaining proper brightness of the structure as well as color and brightness contrast of the object with its background.

Both searchlights and general purpose floodlights used for monument floodlighting are usually of the enclosed, heavy duty type units, of cast aluminum, built to withstand strong punishment. Gasketed, watertight fittings are used to protect lamp receptacles and reflectors. The hinged door of each unit, containing a heat resistant lens, should clamp tightly to the housing. The housing and door assembly may be supported by a steel U-frame which allows for both horizontal and vertical adjustment.

Aside from modifications in capacity and size, searchlights differ from floodlights principally in reflector design. The searchlight reflector provides a concentrated light pattern with a 2° to 5° spread, and also has an auxiliary reflector to redirect the normal spill light into the main reflector, thereby boosting the fixture's efficiency.

To point out dissimilarities between monument floodlighting techniques and other common floodlighting applications, such as public buildings, stadia, or commercial or industrial structures, here are two typical examples—exterior floodlighting of the San Jacinto battlefield monument, Pasadena, Texas, and interior floodlighting of the Thomas Jefferson statue in the Jefferson Memorial, Washington, D. C. Both installations were engineered and equipped by Crouse-Hinds Company.

Exterior Monument Floodlighting

Constructed in 1937 to commemorate the battle that won independence for Texas from Mexico, the San Jacinto Memorial stands 570 ft above the battlefield. At its base is a museum, the walls of which are inscribed with historic data about the battle. The monument is crowned with a gigantic five-pointed star, carved in full relief to symbolize the state of Texas. Vertical lines of the monument are broken at its base by four panels of sculpture in low relief.

Monument's floodlighting is located in two distinct areas. At each of four corners, 160 ft away from its base, seven floodlight units are clustered on a steel pole 18 ft high—three 1500-watt searchlights, two 1500-watt and two 1000-watt floodlights. The 1000-watt units are equipped with 400-watt mercury vapor lamps, and are not intended to beautify the monument but rather to provide illumination throughout the night that will provide light for protection while the main lighting is off. Some of the searchlights shine directly on the Lone Star ornament atop the memorial.

Along each side of the museum roof, 30 ft from the monument base, six floodlights are arranged along the inside of a 7-ft high wall that borders the edge of the roof (see sketch). These floodlights cover the bulk of the monument's lower surface. Floodlighting for one side, for instance, consisting of type ADE-16 units, is arranged as follows: at the ends, two units (C) are equipped with plain lenses and 1000-watt, G-40 floodlight service lamps; next to them are two units (D) equipped with 50-degree vertical spread, clear lenses and

Floodlight Schedule for San Jacinto Memorial

No.	Type	Description	Lamp	Bulb
12	A	Type DCE-18 searchlights (C)	1500 w.	G 48
8	B	Type LCE-1120 floodlights (PL)	1500 w.	G 48
8	B1	Type ADE-14 floodlights (PL)	400 w.	H400
8	C	Type ADE-16 floodlights (PL)	1000 w.	G 40
8	D	Type ADE-16 floodlights (SPV)	1000 w.	P552
8	E	Type ADE-16 floodlights (SWV)	1000 w.	P552

1000-watt, PS-52 general service lamps; and in the center, two units (E) with 100-degree vertical spread clear lenses, also are equipped with PS-52 lamps. Each pair of floodlights illuminates a vertical section on the lower third of the monument which, added to other lighting, provides even illumination over the entire structure.

Interior Monument Floodlighting

Focal point of the Jefferson Memorial, in Washington, D. C., of course, is the heroic statue of Thomas Jefferson. It is 19 ft tall and stands in the center of the memorial room upon a pedestal of black Minnesota granite reaching 6 ft from the floor. It stands in marked contrast amid the memorial's interior of white Georgia marble. The four colonnaded openings of the memorial—two on the east-west axis, and two on the north-south—make it possible to view the figure from many different angles.

The memorial's main entrance faces north. As visitors approach this entrance, they see the statue in bold relief against a sky exposed by the south entrance. In addition, the statue, being almost black, absorbs rather than reflects light. Without artificial illumination, its features are indistinguishable.

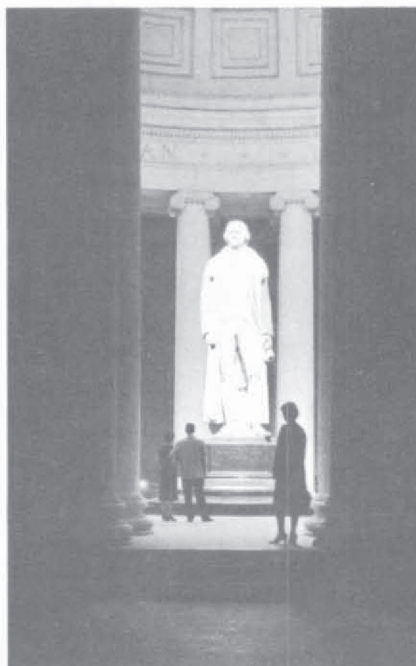
To remedy this problem, the National Capitol Parks Service installed nine stage type spotlights, equipped with 1000-watt, 115-volt lamps, in the rotunda on the north end of the memorial. These spotlight units were mounted behind the rotunda ceiling, approximately 50 ft from the floor and 8 ft apart, so as to project down at the statue through oval shaped apertures cut out of the ceiling. But the illumination output of this arrangement proved unsatisfactory. So that the statue's features might be seen clearly against the background of the sky, National Capitol Parks' electrical specialists estimated that 200 footcandles would be necessary.

As a test, eight Crouse-Hinds type DCE-12 searchlights equipped with 500-watt, 115-volt spotlight display lamps replaced the stage type spotlights. They were mounted temporarily along a horizontal parapet in the rotunda, and demonstrated for the benefit of the Parks Service and Rudolph Evans, sculptor of the statue.

The test disclosed not only that



STATUE of Thomas Jefferson faces main (north) entrance of Jefferson Memorial, Washington, D. C., standing out in bold relief under 200-footcandle illumination provided by 12 500-watt spotlight lamps in Crouse-Hinds searchlights.



FOUR COLONNADED openings in Jefferson Memorial—two on east-west axis—two on north-south axis—expose statue to sunlight from many angles. High intensity lighting is necessary so statue's features are discernible during day when viewed against natural light.



SEARCHLIGHTS are mounted 8 ft apart behind rotunda ceiling, approximately 50 ft above floor, and aimed through oval-shaped openings cut in the Georgia marble ceiling. Average intensity on statue's surface from 12 500-watt units is 200 footcandles.

the searchlights set off the statue's features clearly—even in broad daylight—but that a reading of 200 footcandles on the statue's surface was obtained. In fact, four additional searchlights were incorpo-

rated into the system which, after the ceiling apertures were enlarged to accommodate the 12-in. diameter searchlights, were placed in the accessible area between the rotunda ceiling and outer roof.

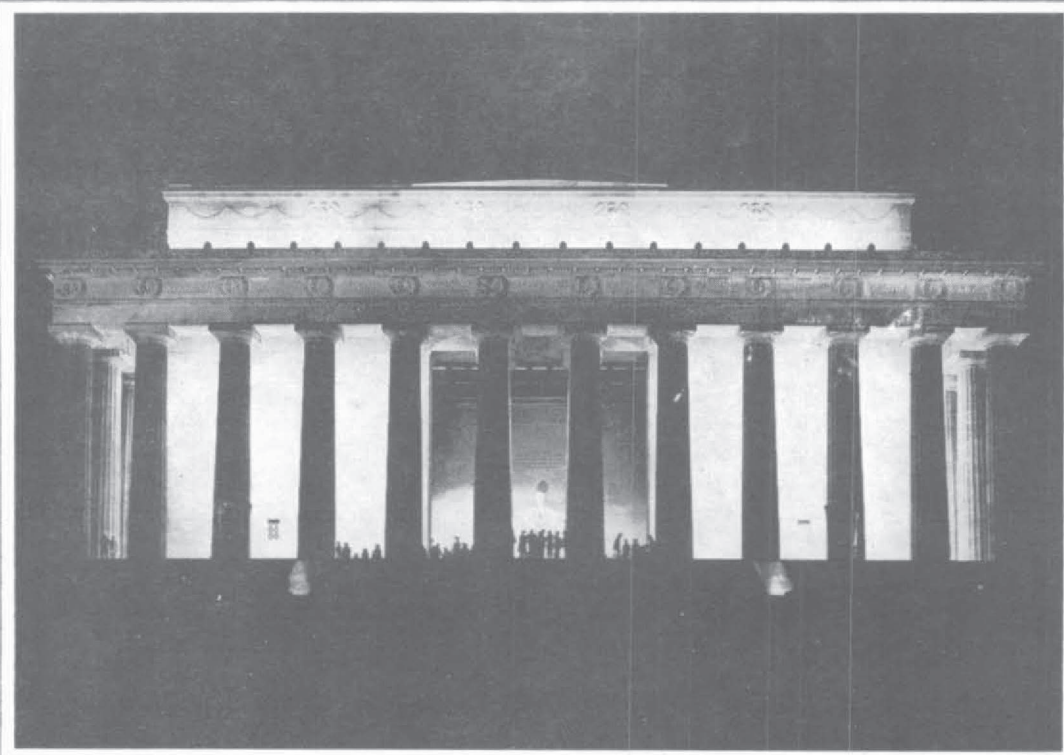
ILLUMINATING ENGINEERING

JOURNAL OF THE ILLUMINATING ENGINEERING SOCIETY

IN THIS ISSUE / FEBRUARY 1970

Lincoln Memorial . . . Synagogue Lighting . . . Modern Hospital
Plan . . . Education Symposium Abstracts . . . Two School
Lighting Designs . . . Color Television Broadcasting





The Lincoln Memorial in Washington, D.C., transformed by a carefully planned new lighting system from a palace of gloom to an inspiring hall of beauty.

Lincoln Memorial Relighted

J. F. Wueste

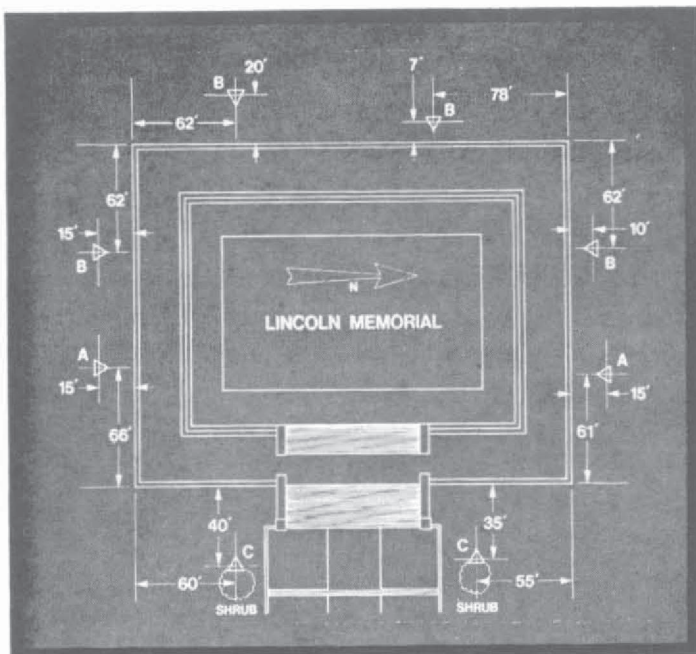
A new lighting system that had to pass the critical judgment of some of the nation's leading art experts has transformed the Lincoln Memorial from one of the country's gloomiest to one of its most impressive landmarks.

The challenge that faced the National Park Service, which has custody of national monuments, was more than just providing light that would bring out the best features of the material. Their mandate from the Fine Arts Commission, which oversees esthetics of public concern in Washington, also was to make the light

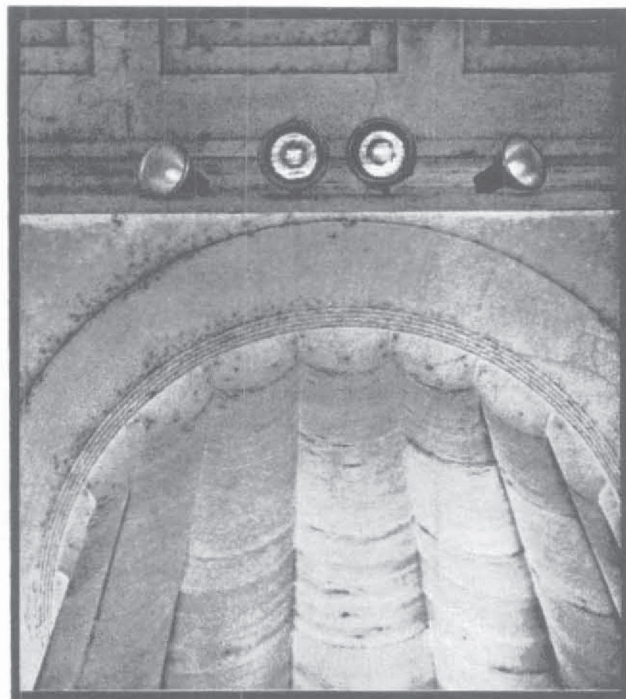
AUTHOR: Crouse-Hinds Co., Syracuse, N.Y.

source either totally hidden or virtually unnoticeable.

Pete Gill, an electrical engineer for the National Park Service, found himself confronted with this task. His agency's proposal for giving a new dimension to the Lincoln Memorial through lighting had caught the fancy of President John F. Kennedy, whose wife also became an active supporter. The Fine Arts Commission, whose members include leading figures in the world of art, such as painter William Walton, favored the idea in principle, but had reservations about the possible poor effect that obtru-



A = 15-foot pole
B = 20-foot pole
C = ground mounted



Inconspicuous luminaires mounted above the columns wash the colonnade walls with even light at night. Illumination level on 78-foot-high walls ranges from 20 on top to 15 at the bottom.

sive fixtures might have on the daytime appearance of the Washington Mall, the Memorial's park setting, as well as the structure itself.

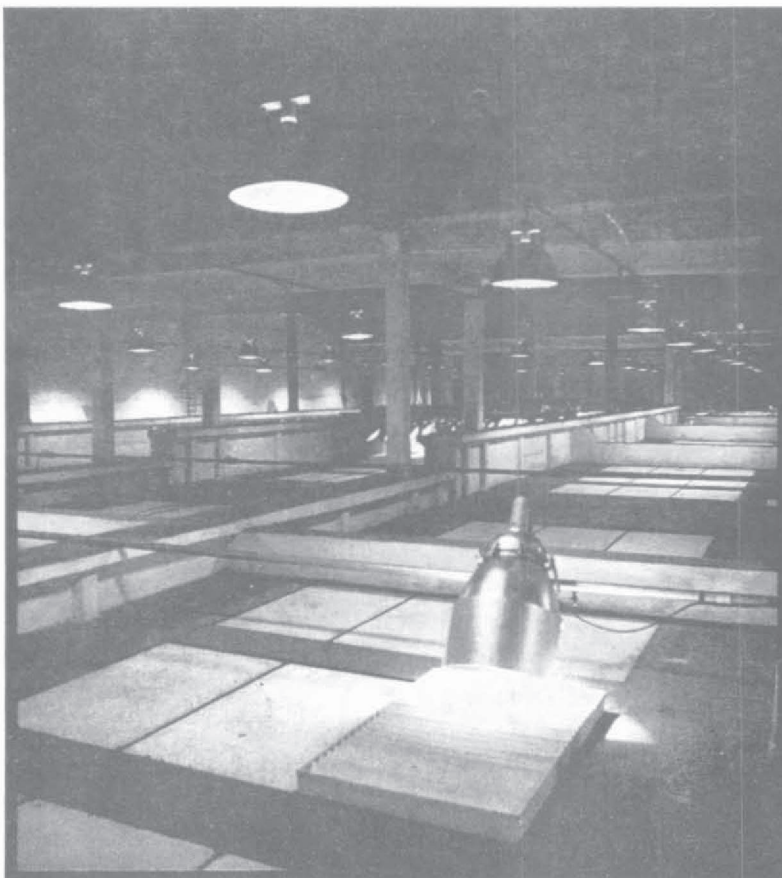
The project was two-fold: relieve the gloom in the Memorial's chamber in which only Lincoln's statue was clearly visible in daytime. (While the statue itself had been illuminated since the Memorial's dedication in 1922, murals and inscriptions on the interior walls had always been difficult to see even in daylight hours.); and make the massive beauty of the exterior a 24-hour landmark.

The only existing lighting consisted of a dozen 1000-watt incandescent units shining on the statue from above the marble ceiling through louvered ports, plus a single, ineffective searchlight aimed at the building from the roof of the distant Roger Smith Hotel. The interior lights made the massive statue dominate its stark surroundings but did little for the setting. Park Service officials felt that making the rest of the interior more visible would add

to the impressiveness of a visit to the memorial.

Two objectives had to be met in designing the interior lighting system. One was to relieve the overall gloom while retaining an atmosphere of reverence. The other was to highlight the engraved texts of the Gettysburg and Second Inaugural addresses on the north and south walls, as well as Jules Guerin's murals. And all this had to be achieved with luminaires that were out of sight.

The attic offered the logical space for the fixtures. Thin slabs of marble impregnated with paraffin constitute the ceiling. The wax treatment, which had been applied during construction, was thought to give the marble extra translucence. Tests made on the panels indicated that the wax treatment was ineffective and a thorough cleaning of the panels helped restore the ceiling to its original appearance and effectiveness in diffusing the daylight entering from the skylights above the ceiling. The new interior lighting provides a uniform ceiling



Lincoln Memorial Relighted

The attic now contains luminaires like this one aimed at engraved and muraled walls below through louvered ports. Light from suspended units is filtered by the translucent marble ceiling to provide diffused lighting to the interior of the Memorial.

brightness regardless of daylight sky conditions, sunny or cloudy.

The light level on the floor was to average five footcandles on cloudy days. The choice of equipment was 400-watt improved-color mercury fixtures, partly because of their long lamp life. Because of the relatively low transmission factor of the marble ceiling, 57 fixtures were required to provide the specified light level for the 13,000 square feet of floor space. The luminaires are suspended six feet above the ceiling to give the effect of even, overall illumination.

Installed at louvered openings in the ceilings are two banks of three 1000-watt improved-color mercury lights with remote ballasts, aimed at the wall inscriptions. This provides 20 footcandles on the target surfaces—enough for easy visibility, without taking the focus of attention away from the central statue.

Footcandle levels on the Memorial's exterior range from 10 along the frieze on top of the



Floodlights aimed at the Memorial's exterior frieze in rear are almost hidden by trees. Pole heights were tailored to camouflaging capacity of existing landscaping. Statue guards the approach to Memorial Bridge which leads to Arlington National Cemetery.

Lincoln Memorial Relighted

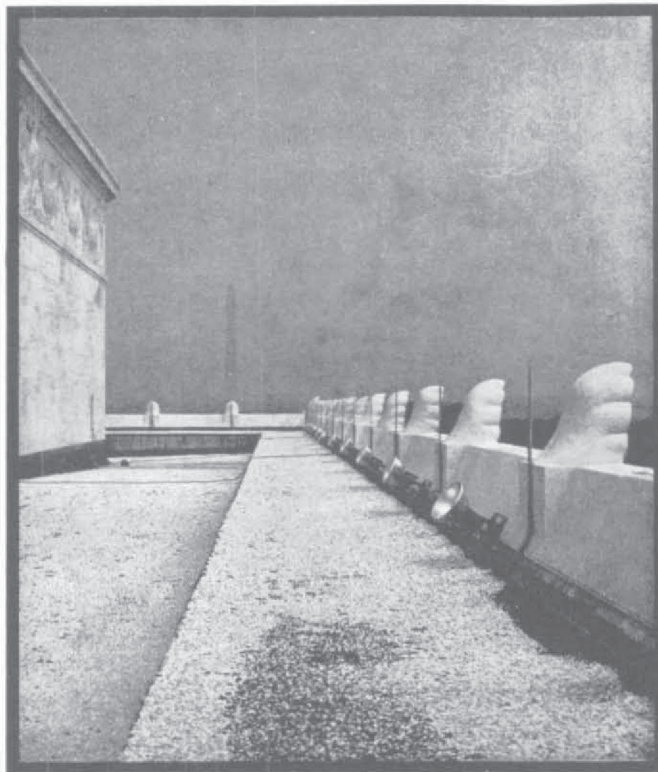
columns to 20 on the walls inside the colonnade and the superstructure. Tungsten halogen fixtures were chosen for maximum color fidelity.

The colonnade walls are illuminated by 120 luminaires of 250 watts each. Two types are used, one with a beam adjustable from 40 to 70 degrees, and the other with a spread of 20- by 42-degrees *H*. Two of each type are mounted in a row in wiring troughs on the top of the inside of 30 of the 38 columns; the exceptions are those at the corners and the entrance. Two of the 40- to 70-degree beam spread units are flanked by two of the others, and all are aimed to deliver uniform lighting without dark or hot spots. The footcandle level drops off gradually from 20 at the top to 15 at the bottom. From a distance, the Doric columns appear silhouetted against the brightly lighted walls.

Rheostat controls allow adjustment of the illumination level. The Fine Arts Commission found the initial setting too high to be esthetically pleasing, and the light level was cut down without difficulty.

Fifty-six 500-watt, wide-beam tungsten halogen luminaires shine on the upper structure housing the attic. They are mounted out of sight behind the frieze above the columns, and are aimed to provide a uniform level of 20 foot-candles on all vertical surfaces.

Two clusters of three 500-watt tungsten halogen floodlights, made inconspicuous by shrubbery, flank the walk leading to the entrance 50 feet from the building at ground level. The rear is lighted by two groups of three flood-

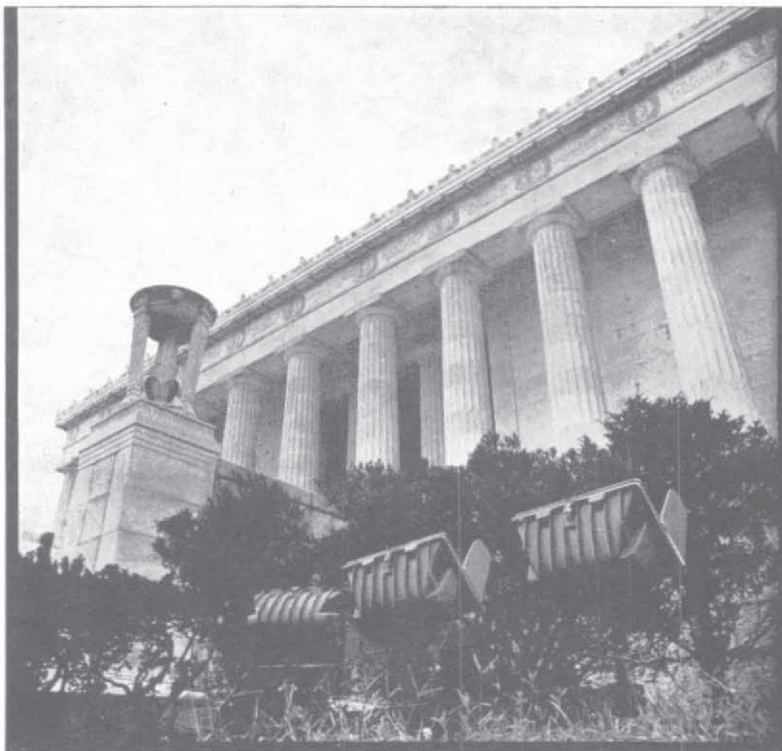


Fifty-six 500-watt tungsten halogen luminaires light Memorial's upper structure.

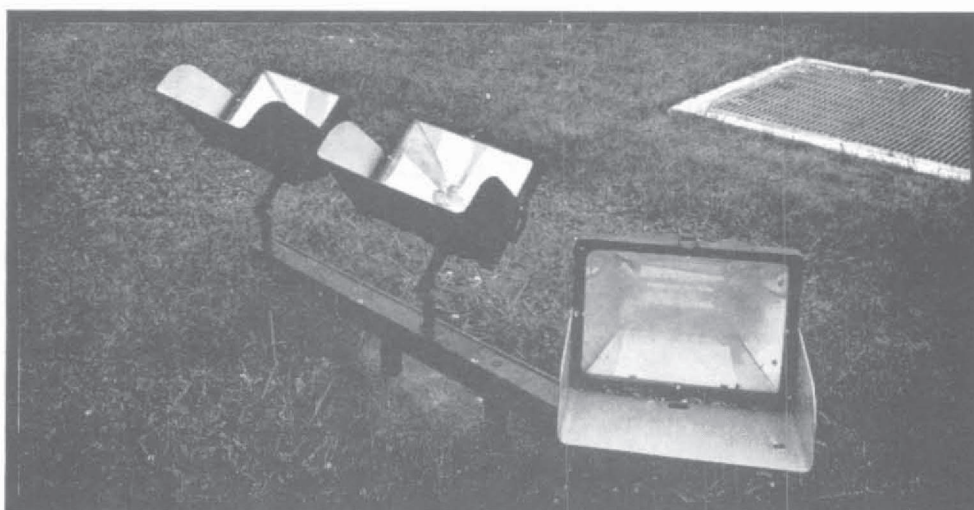
lights on poles set back 50 feet, and two pole-mounted pairs of fixtures 30 feet away illuminate each of the two sides. Originally, 20-foot poles were planned; but the state of growth of existing trees utilized for camouflage limited the height of some poles to 15 feet. All these fixtures have weatherproof covers.

The main purpose of these outdoor lights is to illuminate the frieze above the columns; therefore, narrow-beam reflectors are used to minimize light spill into other areas. However, two fixtures in front are aimed at columns to soften the stark silhouette effect.

The interior lights are intended to stay on day and night. The outdoor system is controlled by an astronomical clock programmed to synchronize the lighting hours with the sea-



Shrubbery conceals weather-proof, 500-watt tungsten halogen floodlights which illuminate frieze and columns. Unobtrusiveness of fixtures was an important condition put on the lighting project by Fine Arts Commission, which controlled esthetics.



Closeup of a bank of 500-watt tungsten halogen floodlights in front of the Memorial reveals aiming angles. Two shine on frieze above columns while third is aimed at columns on far side to soften starkness of silhouette effect. An identical bank on the other side of the entrance is not shown.

sonally changing length of the nights.

Thus the system for all practical purposes is self-operating. Maintenance, too, will require a minimum of manhours. The inside mercury lamps have a life expectancy of 24,000 operating hours, or almost three years. And the tungsten halogen lamps outdoors are not likely to require attention between periodic cleanings.

Two years after the idea was first voiced by

the Park Service the plans were ready; much of the interim was needed to see the proposal through the appropriate administrative and congressional channels. The installation contract went to C. G. Estabrook Electrical Contractors of Arlington, Virginia.

Installation took less than six months. The lights were first turned on January 20, 1969, at President Nixon's inaugural festivities. □

MARCH 1971

ELECTRICAL

CONSULTANT



Veil of darkness lifts from DC's Federal Triangle

DC becoming "city of lights"



Above: Increased beauty for historic Constitution Avenue also means greater safety at night. Left: The Federal Trade Commission Building, one of the newly lighted structures in the Federal Triangle.

By D. W. Pinegar, Crouse-Hinds Company, Syracuse, New York.

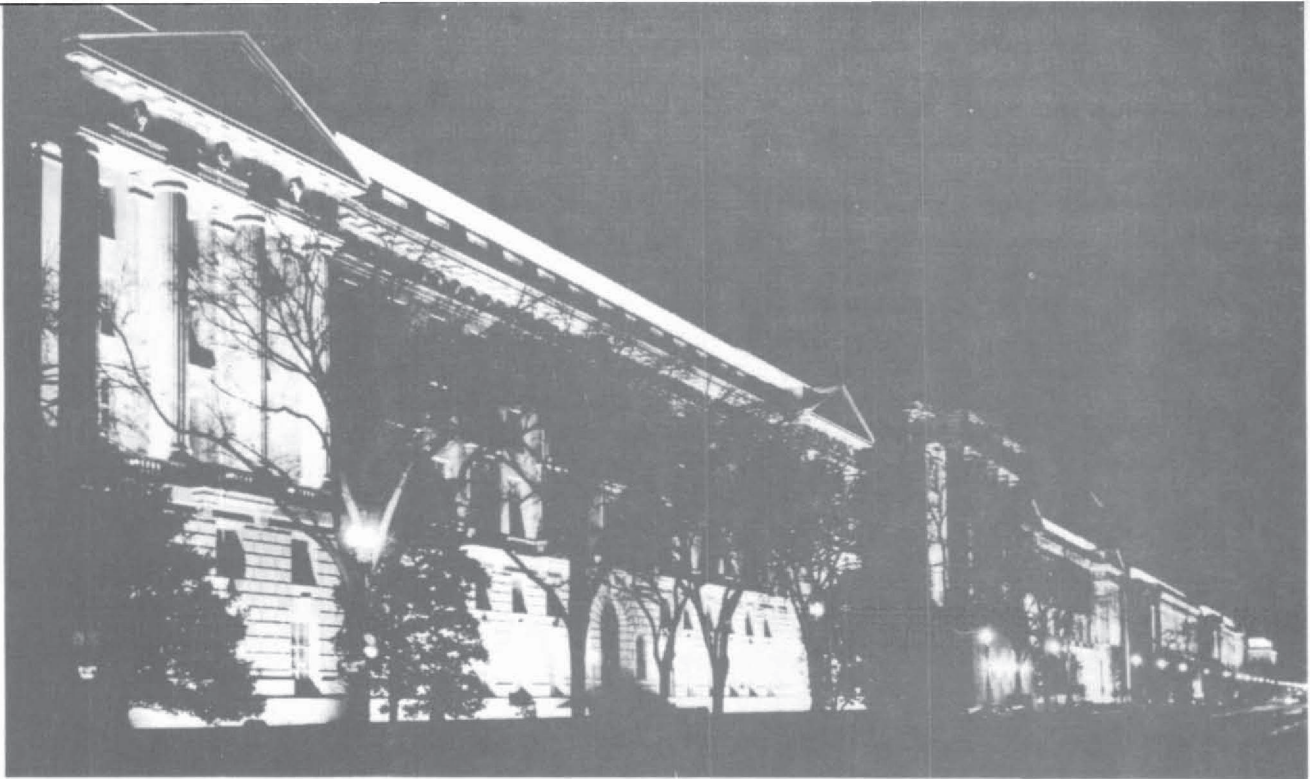
■ A new and dramatic outdoor lighting system consisting of more than 1100 luminaires lifted the veil of darkness from around the Federal Triangle in Washington, D.C., when Robert L. Kunzig, Administrator of the General Services Administration and official representative of President Nixon, switched on the lights for the National Christmas Tree, December 16, 1970.

The famous eight-block Triangle, bounded by Pennsylvania and Constitution Avenues and 15th Street, is the site of many of the major federal bureaus including the Federal Trade Commission, the Internal Revenue Service, the Federal

Bureau of Investigation, the Post Office, and the departments of Labor and Commerce.

The permanent lighting system is much more than a spectacular addition to the 1970 holiday scene in Washington. It is transforming this section of the city into an afterdark attraction for visitors, residents, and Capitol workers who previously detoured the shadows in favor of better lighted areas of the city.

Program's objectives. The objectives of the lighting program are to beautify the architectural features for night enjoyment and to reduce the area's crime rate. The program is part of a long-term government plan to turn downtown Washington into a "city of lights." Sanders & Thomas, Inc., of



A basic up-lighting technique highlights architectural features, giving texture and relief.

Pottstown, Pa., was selected by the supervising General Services Administration to be architect-engineers and design consultants. The project also was coordinated with the Fine Arts Commission and the District of Columbia government.

Sanders and Thomas spent five months designing the lighting system which will be completed this spring at a cost of \$955,000. A variety of six different luminaires manufactured by Crouse-Hinds were chosen to meet the demanding requirements of hard-to-light Gothic columns, crown-shaped domes, and ornate horizontal and vertical surfaces. Crouse-Hinds fixtures and designs have been used for many of the country's notable monuments and landmarks—Mount Rushmore, the National Archives, the Treasury Department, and the Washington, Jefferson, and Lincoln memorials.

As requested by the Fine Arts Commission, the permanent lighting system will be virtually hidden, so that the luminaires are unobtrusive in the daytime. They will also be less vulnerable to vandals. Similar lighting techniques are used for each building to allow presentation of the Triangle as a totally integrated architectural design. The illuminating engineers determined that an average light level of approximately 10 footcandles on the main portions of the buildings provides suitable blending of light with that on the Capitol building without

detracting from it. The light reflected off the buildings onto adjacent sidewalks provides basic protective lighting around the buildings and fills in shadow areas untouched by street lights.

Up-lighting technique. To capture the true texture and variety of planes in the main portions of the building facades, a basic up-lighting technique is used in which the light tapers off toward the top of the building. This technique eliminates the bland effect of flat lighting, which loses texture and relief. The darkness at the extreme top portion of the building is then cut by a band or crown of light delivered through broad, even illumination of higher intensity. The resulting contrast realistically portrays the depth and dimension of the building's architectural design.

Free-standing columns are illuminated softly, while more intense light is placed on the walls behind them. Semisilhouetted, the columns add strength, dignity, and permanence to the appearance of the Federal Office Buildings that stretch along the avenues leading from the Capitol to the White House.

Of the more than 1100 Crouse-Hinds luminaires used in lighting the Triangle, approximately 900 are used with 400-watt metal halide lamps, the remaining with 175-watt mercury vapor lamps. The larger number consists of four different types of luminaires used to effect the major portion

Modern techniques emphasize historic charm

of the building lighting.

Lighting criteria. The metal halide light source was selected for its ability to deliver excellent color rendition at high efficiency (75 to 90 lumens per watt) and low operating cost. Also important are its characteristics of good beam control and long lamp life, which decreases relamping and maintenance costs. Color rendition and efficiency of the metal halide lamps are unaffected by changes in temperature, important for a year-round lighting system.

These enclosed fixtures are made of high-impact resistant cast aluminum. The housing and relamping doors are corrosion resistant, and the lenses are tempered glass. The weatherproof fixtures contain a pre-wired integral ballast—quickly accessible through a ballast door—that has saved the installation time required for mounting and

wiring remote ballasts. Where focusing of the light beam is required, the luminaires provide a focus adjusting screw.

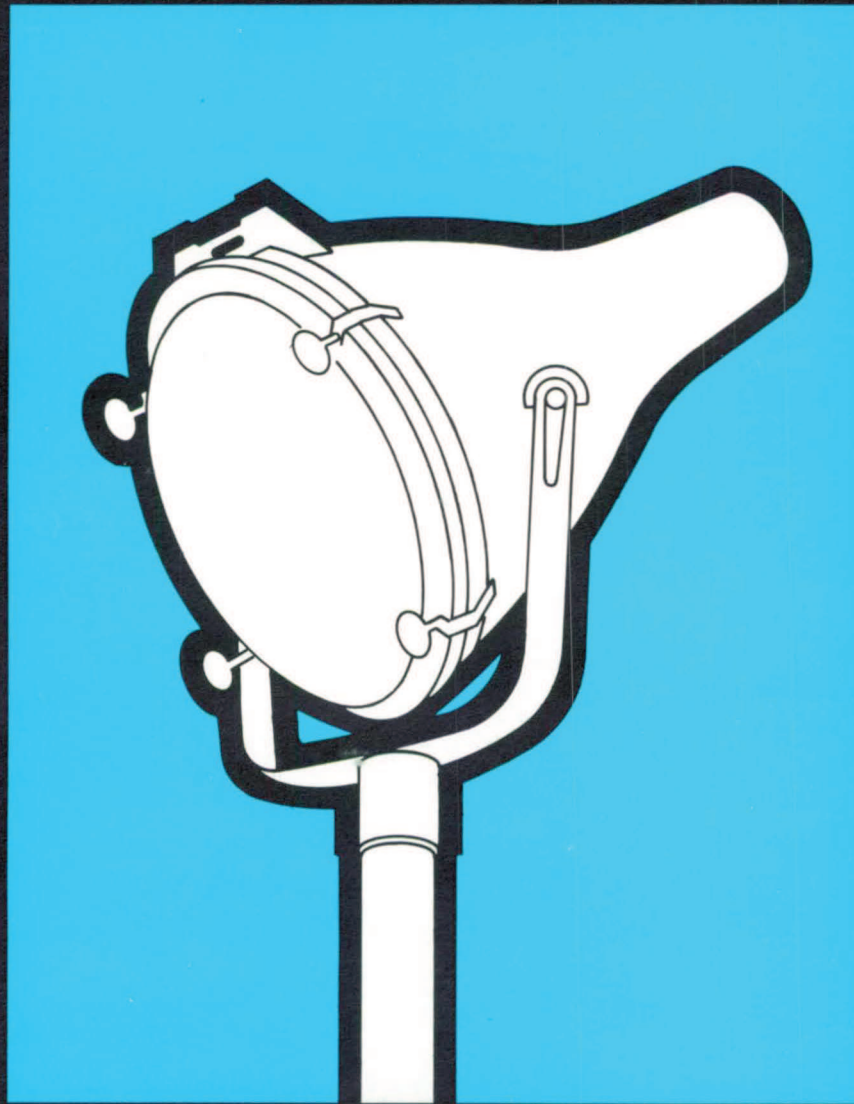
Step entrances and doorways in the Triangle are illuminated by antique carriage type lanterns. While the historic charm of the lantern exterior remains unchanged, the interior parts have been modernized to generate more light with less relamping and maintenance expense. The old incandescent interior parts were replaced with a mercury vapor/metal halide light fixture designed for quick, easy changeover of existing incandescent systems without rewiring. The compact units with integral ballast fit inside the old lanterns. Mercury vapor lamps, 175-watt size, were selected.

Installation of the Federal Triangle lighting system was handled by the E. C. Ernst Company, Washington, D.C. □



Light reflecting off the Federal Trade Commission Building increases sidewalk illumination.

CROUSE-HINDS
ADE



ADE

The ADE is a heavy duty floodlight, designed for lighting industrial areas, construction sites, loading and storage areas, and similar areas. The ADE can also be used in marine areas, including shipboard uses. It meets Underwriters' Laboratories Standard 595, "Marine Electric Lighting Fixtures"

The unit is constructed of a cast aluminum, corrosion-resistant housing and hinged door, Alzak aluminum reflector (wide or narrow beam), silicone rubber lens and door gaskets. A 4' section of 3/C cable is provided on all units.

LAMPS

The ADE comes in two sizes depending on type of lamp desired: ADE-14 for use with 300W or 500W incandescent, 400W mercury or metal halide lamps; and ADE-16 for use with 1000W incandescent, mercury or metal halide lamps. Both ADE-14 and ADE-16 require external ballasts when using mercury vapor and metal halide lamps. MPB ballast housings are recommended—see Ballasts for ordering information. Consult Crouse-Hinds for use of ADE units with high pressure sodium lamps.

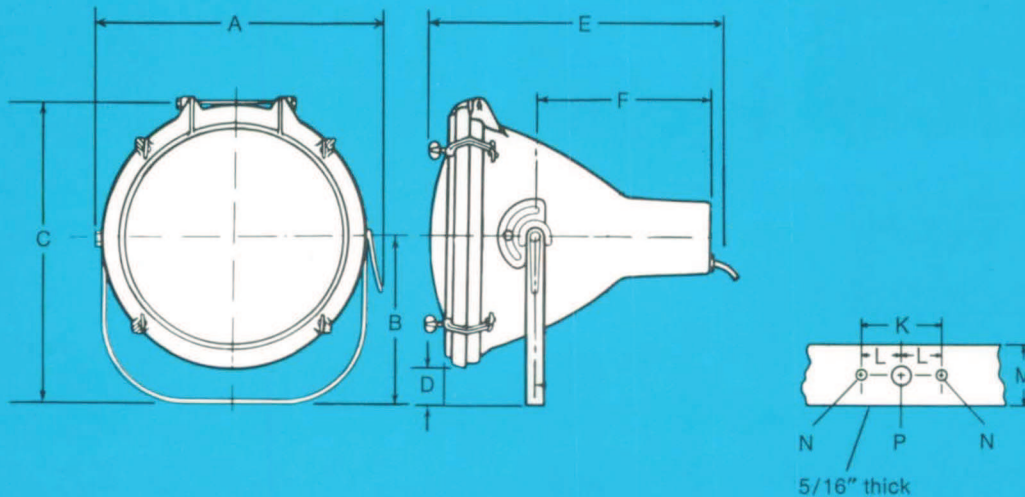
FINISHES

Units have a natural aluminum finish with a galvanized steel trunnion arm.

MOUNTING

Units can be mounted on wood, steel or aluminum poles. Pole mounting brackets are available (see listings). For poles and other mounting brackets, see Poles, Brackets & Accessories.

DIMENSIONS



MODEL	OVERALL DIMENSIONS						EFF. PROJ. AREA (SQ. FT.)	TRUNNION HOLE SPACING AND DIAMETER				
	A	B	C	D	E	F		K	L	M	N	P
ADE-14	19	10-1/2	19-3/4	2-1/8	18	11-3/4	2.0	3-5/16	1-21/32	1-1/2	7/16	11/16
ADE-16	21-1/8	14-1/2	24	4-1/4	21-5/8	13-3/4	2.4	3-5/16	1-21/32	1-1/2	7/16	11/16

CONSTRUCTION FEATURES

Heat-resisting lens gasketed to door frame.

Hinged door—open for re-lamping.

Cast aluminum housing and door.

Alzak aluminum reflector.

Vertical quadrant and re-positioning stop.

Clamp handle

Positive action "C" clamp and wing screw.

Galvanized steel trunnion arm.

4', 3/C cable enters housing through watertight bushing.

ORDERING INFORMATION






MODEL	WATTS	LAMP TYPE	REFLECTOR	LENS	CATALOG NUMBER	NET WEIGHT (LBS.)
ADE14	300W, PS-35 or 500W, PS-35	Incandescent	Wide Beam	Diffusing	48004	26
				Smooth Beam	48043	
				Medium Spread	48044	
				Wide Spread	48045	
			Narrow Beam	Diffusing	48018	
				Smooth Beam	48047	
ADE16	400W	Mercury Vapor or Metal Halide†	Wide Beam	Medium Spread	48048	34
				Wide Spread	48049	
	1000W, PS-52 or 700W	Incandescent or Mercury Vapor†	Wide Beam	Diffusing	48304	
				Smooth Beam	48305	
				Medium Spread	48307	
				Wide Spread	48066	
	1000W, PS-52	Incandescent	Narrow Beam	Smooth Beam	48067	
				Medium Spread	48068	
				Wide Spread	48069	
				Diffusing	48076	
	1000W*	Mercury Vapor or Metal Halide†	Wide Beam	Smooth Beam	48077	
				Medium Spread	48078	
					48079	
					48115	
					48116	






*ADE-16 maximum lamp size limited to 700 watts when aimed above horizontal.

†Mercury and metal halide units do not include ballasts. MPB ballast housings are recommended—see Ballasts for ordering information.

NOTE: All model ADE floodlights meet UL standard 595 for "Marine type electric lighting fixtures".

MOUNTING ACCESSORIES

DESCRIPTION	CATALOG NUMBER
 2" slipfitter	ML3634
 Flat base (two 1/2" mtg. holes on 4" centers) (Not for marine use)	ML13A
 Triangular flat base (three 1/2" mtg. holes, 90° apart) (For marine use)	ML3644
 Pole bracket	ML1539
 Wheel base (14" dia.)	ML3643

DESCRIPTION	CATALOG NUMBER
 U-bolt base for 1"-2" pipe	FL1273
 Sheet aluminum hood with mounting hardware for ADE-14	ML3666
 Sheet aluminum hood with mounting hardware for ADE-16	ML3667
 Guard with mounting hardware for ADE-14	ML3669
 Guard with mounting hardware for ADE-16	ML3670
Thompson hanger mounting—order standard unit, no mounting arrangement required.	

LIGHTING DATA (for estimating purposes)

LAMP WATTS & TYPE	LAMP LUMENS	IES-NEMA FLDT. TYPE	BEAM HOR.	SPREAD VERT.	BEAM LUMENS	EFF.	CANDLEPOWER AV. MAX.	MAX.	MODEL	CATALOG NUMBER
Incandescent 500W, PS35 (500)	10750	2	28°	24°	4100	39.0%	67500	74200	ADE-14	48047
		4 x 2	57°	25°	4580	42.6%	27850	28720	ADE-14	48048
		4	49°	45°	5010	46.3%	24300	25950	ADE-14	48043
		4	69°	69°	5450	50.6%	12720	15730	ADE-14	48018
		5 x 3	76°	43°	5740	53.2%	15860	17200	ADE-14	48044
		5	87°	87°	6350	58.8%	9270	11070	ADE-14	48004
		7 x 3	134°	32°	4940	46.2%	10620	13200	ADE-14	48049
Incandescent 1000W, PS-52 (1000)	23000	7 x 4	141°	51°	5800	53.8%	7890	8260	ADE-14	48045
		2	26°	28°	7585	32.9%	110290	118305	ADE-16	48077
		3 x 2	44°	26°	8185	35.5%	69400	75450	ADE-16	48078
		4	52°	51°	9210	40.0%	45820	51100	ADE-16	48067
		4	56°	57°	10200	44.4%	32200	35850	ADE-16	48076
		5 x 4	81°	54°	11370	49.3%	25850	30200	ADE-16	48068
		5	99°	95°	12620	54.8%	13180	16700	ADE-16	48066
400W, Clear Mercury Vapor	21000	7 x 3	131°	39°	10120	43.9%	19040	20800	ADE-16	48079
		7 x 4	142°	51°	12220	53.1%	13100	15980	ADE-16	48069
		4	48°	50°	9920	47.2%	46200	91700	ADE-14	48305
400W, Coated Mercury Vapor	23000	7 x 4	136°	55°	11100	52.8%	13800	17650	ADE-14	48307
		5	83°	81°	11450	54.4%	19350	23550	ADE-14	48304
		5	90°	92°	12535	54.5%	14625	16196	ADE-14	48305
400W, Clear Metal Halide*	34000	7 x 5	160°	90°	11132	48.4%	6092	6552	ADE-14	48307
		3	46°	45°	16286	47.9%	97958	158542	ADE-14	48305
		7 x 4	139°	55°	19483	57.3%	25560	33332	ADE-14	48307
1000W, Clear Mercury Vapor	57000	5	83°	85°	20298	59.7%	32722	43932	ADE-14	48304
		6 x 5	78°	88°	24750	43.5%	47200	153000	ADE-16	48115
		6	104°	99°	27800	48.9%	35000	74800	ADE-16	48116
1000W, Coated Mercury Vapor	63000	6	114°	114°	32256	51.2%	21609	22990	ADE-16	48115
1000W, Clear Metal Halide*	100000	5	80°	90°	45000	45.0%	86103	279972	ADE-16	48115
		6	105°	100°	50000	50.0%	62994	134431	ADE-16	48116

*Metal halide lamps are available for burning base up to 15° below horizontal or base down to 15° above horizontal. Order correct lamp for specific installation.

All data based on floodlights tested in accordance with I.E.S. procedures.



Relamp Champ II Lighting Fixtures

Integral Ballast Enclosed and Gasketed (Vaportight)

Application:

- Used in industrial locations, indoors and outdoors, where moisture, dirt, corrosion, vibration and rough usage are a problem
- Used where relamping is difficult and long lamp life is required
- Ideal for walkways, bridges, tunnels, security lighting, roadways, cold storage facilities, garages, and processing plants
- Used where high light output is needed but space is limited
- Used where low headroom is a problem—100, 175 and 250W

Features:

ALL UNITS:

- Several mounting arrangements:
 - Pendant for rigid mounting
 - Flexible pendant for mounting with flexible hangers—(except 400 W)
 - Ceiling for flush or surface mounting
 - Wall bracket—through feed
 - Stanchion—25° angle
 - Built-in long-life ballast
 - Choice of light source—mercury vapor and metal halide
 - 24,000 hour lamp life—100, 175, 250 and 400 watts, mercury vapor
 - 7,500 hour lamp life—175 and 400 watts, metal halide
 - High lumen output
 - Photocells provide dusk-to-dawn capability
 - Operates at temperatures as low as minus 20°F (for lower operation, contact factory)
 - Attractive beige epoxy finish
 - Prismatic refractors
 - Recessed hubs
 - Now possible to furnish 600 volt rated fuses for isolating a faulted unit before it can shut down a whole bank of lights connected on a common breaker or fuse (except VMCK)
 - All units have mogul base lamp sockets
- ##### 100, 175 AND 250W UNITS:
- Compact, low silhouette
 - Globe and guard installed and removed as a single unit
 - Reflectors, vented to minimize dirt accumulation, lock to ballast housing with single twist (except VMCK—see separate listings under accessories).
 - Tested for 100 mph winds
 - Modular design—one ballast housing fits all mountings, hinges to mounting for easy installation
 - Inner reflector for correct light control
 - Configured globes
- ##### 400W UNITS:
- Two models available:
 - Type R54 (or R24) with glass type V (or type II) closed refractor
 - Type RD4, with etched Alzak reflector and gasketed glass door
 - Type R54 (or R24) has inner auxiliary

Class I, Division 2 ♦ Class II, Division 2 Class III

Accessories Pg. 3L-4 Dimensions Pgs. 3L-6, 7

reflector for maximum lighting efficiency. Refractor and adaptor are removed for relamping and cleaning by rotating 13°, freeing keyhole slots in adapter from 4 studs in ballast housing

- Type RD4 has simple over-center latch for easy opening for relamping and cleaning

Both models have symmetrically distributed weight so that standard pendant mounting may be used with rigid or flexible hangers

VMV:

- Normal power factor
- 120, 208, 240 and 277 volt models

VMVC:

- Constant wattage auto transformer
- More stabilized light output
- Low line extinguishing voltage
- Line starting current lower than operating current

- 120, 208, 240, 277 and 480 volt models

VMVM:

- Uses metal halide lamps—approximately 50% higher light output than mercury vapor
- Constant wattage auto transformer
- More stabilized light output
- Low line extinguishing voltage
- Line starting current same as operating current

- 120, 208, 240, 277 and 480 volt models

VMCK:

- Normal power factor
- 120 volt model only
- Quick conversion of existing incandescent lighting fixtures to more economical mercury vapor without rewiring. No tools needed. Takes less than 5 minutes to convert
- Adapter rings to adapt to almost any make or size incandescent fixtures

Standard Materials:

ALL UNITS:

- Ballast housings, mountings, and guards—copper free aluminum (less than 0.4 of 1%)
- Exterior hardware—stainless steel

100, 175 AND 250W UNITS:

- Globes—configured glass
- Refractors—glass and plastic
- Reflectors—fiber glass reinforced polyester (Krydun™)

400W UNITS:

- Reflectors and refractor adapters—copper free aluminum (less than 0.4 of 1%)
- Refractors—glass
- Reflector door—tempered glass with stainless steel frame

Standard Finishes:

ALL UNITS:

- Ballast housings, mountings and guards—beige epoxy enamel
- Exterior hardware—natural

3L-1

Crouse-Hinds



100 and 175W
pendant mount with
globe and guard



250W pendant
mount with
globe and
guard



400W pendant mount
with glass refractor

100, 175, AND 250W UNITS:

- Reflectors—white
- 400W UNITS:
 - Reflectors—etched Alzak aluminum, natural
 - Refractor adapters—aluminum, natural

Options:

- Fuse—to protect against abnormal line conditions and provide additional circuit protection. One fuse required for 100, 175 or 250W units and for 120 or 277VAC 400W units. Two fuses needed for 208, 240 or 480VAC 400W units. (Not available for VMCK). Add suffix S658 to Cat. No.
 - Corro-free epoxy enamel—add suffix S602 to Cat. No.
 - Quartz auxiliary lamp to provide light during the 3-5 minutes required for mercury or metal halide lamp to restrike following resumption of power after a power failure. Add suffix QTZ to Cat. No.
- ##### Size Ranges:
- 100 to 400 watts (see page 3L-12)

Electrical Rating Ranges:

- 120 to 480 volts

Compliances:

- NEC: Class I, Div. 2
Class II, Div. 2
Class III
- UL standard 57
- Meets requirements for any environment up to 50°C ambient

♦ Suitability of fixtures in hazardous areas is dependent on temperature and substance present. See pages L-6 and L-7 of Lighting Selector Guide for detailed data.

**Relamp Champ II
Mercury Vapor
and Metal Halide
Lighting Fixtures
Enclosed and
Gasketed (Vaportight)**

**Class I, Division 2♦
Class II, Division 2
Class III**

**Photometric Data
Pgs. 3L-8 to 11**

Crouse-Hinds



**400W
Pendant Mount
with Glass Refractor**



**400W
Pendant Mount
with Reflector/Lens**



**100-250W
Pendant Mount**

	Lamp Watts	Hub Size	Pendant Mount Cat. #
120V Mercury Vapor Normal Power Factor Ballast (50%)—See NOTES			
With Globe and Guard**	100	3/4 1	VMV2A100GP VMV3A100GP
	175	3/4 1	VMV2A175GP VMV3A175GP
120V Mercury Vapor Constant Wattage Ballast (Min. P.F. 90%)—See NOTES			
With Globe and Guard**	100	3/4 1	VMVC2A100GP VMVC3A100GP
	175	3/4 1	VMVC2A175GP VMVC3A175GP
With Type V Glass Refractor†	250	3/4 1	VMVC2A250GP VMVC3A250GP
	400	3/4 1	VMVC2A400R54 VMVC3A400R54
With Etched Alzak Reflector and Tempered Glass Lens	400	3/4 1	VMVC2A400RD4 VMVC3A400RD4
120V Metal Halide Regulated Output Ballast (Min. P.F. 90%)— See NOTES			
With Globe and Guard**	175§	3/4 1	VMVM2A175GP VMVM3A175GP
With Type V Glass Refractor†	400	3/4 1	VMVM2C400R54‡ VMVM3C400R54‡
With Etched Alzak Reflector and Tempered Glass Lens	400	3/4 1	VMVM2C400RD4‡ VMVM3C400RD4‡

NOTES:

Catalog numbers shown are basic numbers. To obtain fixture with desired ballast voltage add voltage suffix to the basic number.

Voltage	Suffix
120	/120
208	/208
240	/240
277	/277
480	/480

Example: VMV2A100GP/120

480V ballast not available for VMV normal power factor fixtures
Illustrations are typical. Catalog listings detail units available by wattage, type of mounting and ballast

