

APPLICATION FOR AMENDMENT
OF LICENSE STA-583
TO PERMIT INCINERATION OF COMBUSTIBLE WASTE

A. INTRODUCTION

Kerr-McGee Chemical Corporation has proposed to the U. S. Nuclear Regulatory Commission a plan for decommissioning and stabilizing its West Chicago Thorium Facility, License No. STA-583, Docket No. 40-2061. This plan contemplates the generation for burial of significant amounts of combustible waste at licensed burial sites. Recently, licensed burial sites have severely restricted the volume of material which they will accept for disposal. Consequently, alternate disposal by incineration was considered.

As a result of these considerations, it has been determined that an incinerator equipped with effluent cleaning equipment can be installed promptly and succeed in reducing the volume of waste generated. The effluent cleaning equipment and the incinerator operating procedures have been in use for several years recovering enriched uranium from similar waste material at the Kerr-McGee Nuclear's Cimarron Fuel Plant, License No. SNM-928, Docket No. 70-925. The equipment will be refurbished, transported to West Chicago, and combined with a new incinerator body. Kerr-McGee Nuclear Corporation personnel experienced in the engineering, maintenance, operation and effluent surveillance will supervise its installation, train operators and establish effluent sampling procedures. Initial start-up with clean waste will be supervised by these personnel. The schematic drawing No. AT-WC-01 provides a general view of the system and is attached.

B. PROCESS DESCRIPTION

1. The Incinerator

The incinerator will be a Model No. FPC-W-48F unit manufactured by the Federal Incinerators, Inc., of Springfield, Missouri. This incinerator is a three chamber, heavy duty machine weighing about 50,000 pounds. The steel shell of the incinerator is lined with firebrick of a temperature grade of 3100 to 3200⁰F, cemented with 1800⁰F insulating cement. The burning chamber, designed to insure proper mixing of the air and combustion products, has a volume of 185 cubic feet. The chamber is equipped with grates to permit ashes to collect in a pit below the chamber. Grates are cast iron and are installed on cast iron bearing bars and angles anchored to the walls. Water mist sprays are provided to dampen the ash to prevent dusting during cleanout. The ash pit doors are refractory lined and measure 15" x 18".

The combustion and bypass chambers are located to the side of the burning chamber and are separated by a firebrick checkerwork which slows the gasses to complete combustion before they are released to the flue. The combined total volume of these chambers is 160 cubic feet. Preheated secondary air is introduced into the combustion chamber to further insure combustion. Two 600,000 BTU/hour primary gas burners and two 600,000 BTU/hour after-burners are provided. All four of these burners have electric ignition and safety shutoff. The main gas supply is safety regulated and will not operate when the filter system/draft fan is turned off.

The charging door is 30" wide and 30" high and is refractory lined. It is manually operated on a roller-rail and is self-closing. A charging shelf is provided in front of the charging opening.

2. Exhaust Cooling

Flue gas, warranted by the manufacturer to meet Illinois particulate discharge limit, is piped through a cooling loop prior to discharge into a bag-house. Cooling air is introduced into the cooling loop through a damper to insure temperature reduction to temperatures below the permissible limit for the bags. To further safeguard the bag-house, a fire screen is installed near the incinerator and a temperature activated controller near the bag-house will increase the cooling air damper opening and sound an alarm if the temperature reaches 450^oF. Damper setting, initially estimated, may be adjusted during start-up and trial runs to insure maintenance of acceptable gas temperature entering the bag-house.

3. Bag-House Air Cleaner

The first stage air cleaner is an American Air Filter Model B-2 fitted with 52 high temperature (550^oF) bags with a maximum capacity of 6000 cfm. This large bag-house measures 37 feet tall with a diameter of about 12 feet supported by steel legs on concrete pads.

The bag-house has a collection efficiency of 99.5%. The air temperature entering the bag-house is maintained between 300^oF-400^oF and is completely insulated to maintain these temperatures during cold weather, preventing condensation.

The bag-house hopper is divided into two sections, each with its own air inlet, "reverse air" connection and pneumatically operated dumper. Dust cleaned from the bags falls into the container beneath the bag-house.

4. Final Filters

The final filtration of the effluent is accomplished by a bank of six American Air Filter A23J8-V-3 Astrocel absolute filters, 24" x 24" x 11.5" with stainless steel housing (or equivalent) rated at 600⁰F. The filters are connected in parallel so each takes one-sixth of the air flow. The plenum assembly is arranged with connections for dioctylphosphate testing. The filter container is sealed to the inlet and outlet plenum so that outside air flows into the system in the event of leakage, thus preventing escape of potential contaminated gasses. The unit is provided with a 6" H₂O Magnahelic gage to indicate pressure drop. The high efficiency particulate absolute filters have a rated efficiency of 99.97%.

5. Exhauster and Sampler

The exhauster is a Phelps HV-1 40" heavy duty fan with a 50 horsepower "V"-belt drive. An electrical connection between the fan and the incinerator fuel-gas system prevents fuel-gas flow unless the fan is operating.

An isokinetic stack sampler is installed and operates continuously when the exhauster is running. The sample is analyzed after each days use of the incinerator.

6. Equipment Operations

The operating procedures generally follow the sequence as shown below:

- a) Prepare stack sampler.
- b) Turn on exhauster fan (this also turns on the stack sampler pump and energizes the gas burner controls).
- c) Turn on gas burners and preheat the incinerator and air filtration system. The system is operated above 300⁰F to assure that trace amounts of corrosive fumes and vapors generated from combustion of organic materials (especially plastics) are maintained above their dew points.
- d) Charge fuel to the burning chamber. The incinerator is rated to burn a maximum of 1000 pounds/hour of "model" fuel. Previous experience has suggested that about one-half of the maximum rate is optimum. The fuel "mix" at the West Chicago site will consist of wood, paper, plastics, composition roofing, rope, rubber, etc., the largest bulk being wood.
- e) Turn off gas and exhauster and allow the unit to cool overnight.
- f) Turn on water spray mist in the ash collection chambers to dampen the collected ash being careful not to "flood" the ash. Using a shovel, clean out the wet ash and place it in a 55 gallon drum. Secure the drum lid and store for ultimate disposal.
- g) Inspect bag-house receiver. Determine the volume of the fly ash on a weekly basis. As a precaution, wear a respirator and a lapel air sampler when performing this inspection and clean out. Dampen the fly ash with water before transferring it to a drum for disposal.

C. EQUIPMENT LOCATION

The incinerator equipment will be located on the West Chicago factory site near building No. 15 where gas, water and power are accessible.

D. THORIUM CONTENT OF TRASH AND ASH

Approximately 190 cubic feet of thorium contaminated combustible trash type material have been measured for radioactive contamination at the West Chicago site. The estimated concentration of natural thorium in the trash calculates to be $1.9 \mu\text{Ci}/\text{feet}^3$ ($6.71 \times 10^{-5} \mu\text{Ci}/\text{cm}^3$). Assuming a 90% reduction in volume by incineration, the ash would contain $19 \mu\text{Ci}/\text{feet}^3$. Thus a 55 gallon drum of ash could contain about 0.14 millicuries of ThO_2 .

E. EXPECTED RELEASES FROM THE INCINERATOR

Based on the performance of this equipment at the KMNC Cimarron Uranium Fuel Plant, the stack effluent should show near background concentrations of radioactivity consistently. The concentration should seldom exceed 25% of the MPC ($5 \times 10^{-13} \mu\text{Ci}/\text{m}^2$) for thorium (nat.), above background. We propose to use an action level of $1.5 \times 10^{-12} \mu\text{Ci}/\text{m}^2$ (0.75 MPC) above background based on the average concentration for a 24 hour day. Samples are collected once each day the incinerator is used. Exceeding this action level requires corrective action to reduce the concentration of radioactivity.

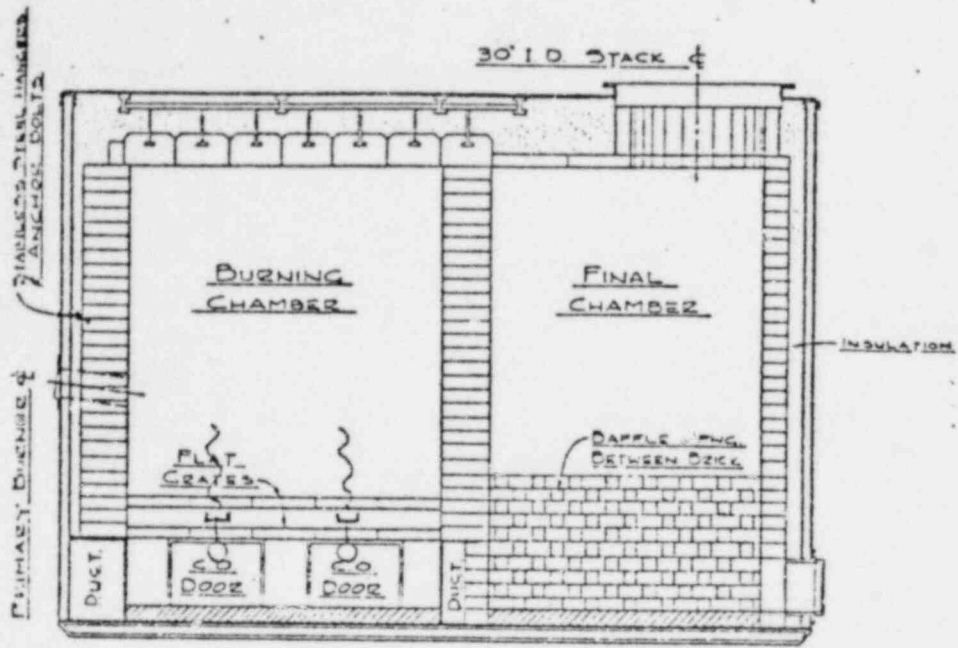
F. OTHER PRECAUTIONS

During the initial phases of start-up and until operation of the incinerator becomes routine, the personnel manning the unit shall wear

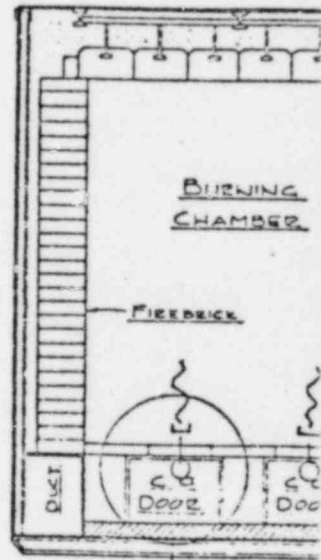
respirators and lapel air samplers. It is expected that respirator use will not be needed after the routine is established, except perhaps for the few minutes it takes to change-out the fly ash receiver beneath the bag-house. These respirator use provisions depend upon the lapel air sample results. We do not anticipate the need to use respirator protection factors for the purpose of calculating personnel MPC-hour exposures.

G. ALARA

We believe ALARA goals are met by the use of the incinerator and its air cleaning equipment as described above. Further progress in achieving ALARA goals for the whole clean-up and decommissioning efforts of the KMCC site is enhanced by the use of this equipment.

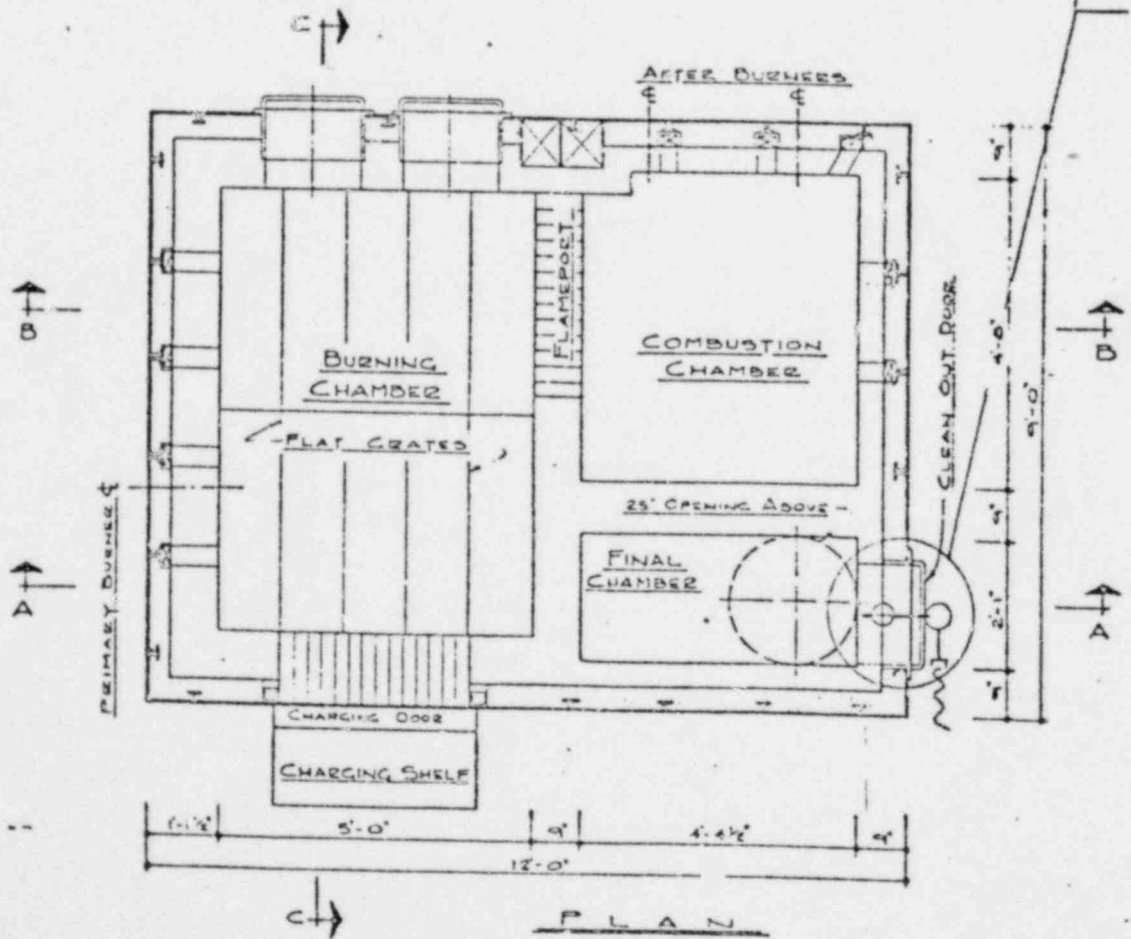


SECTION A-A

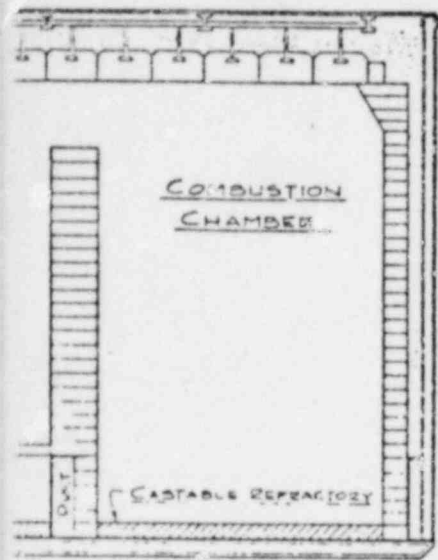


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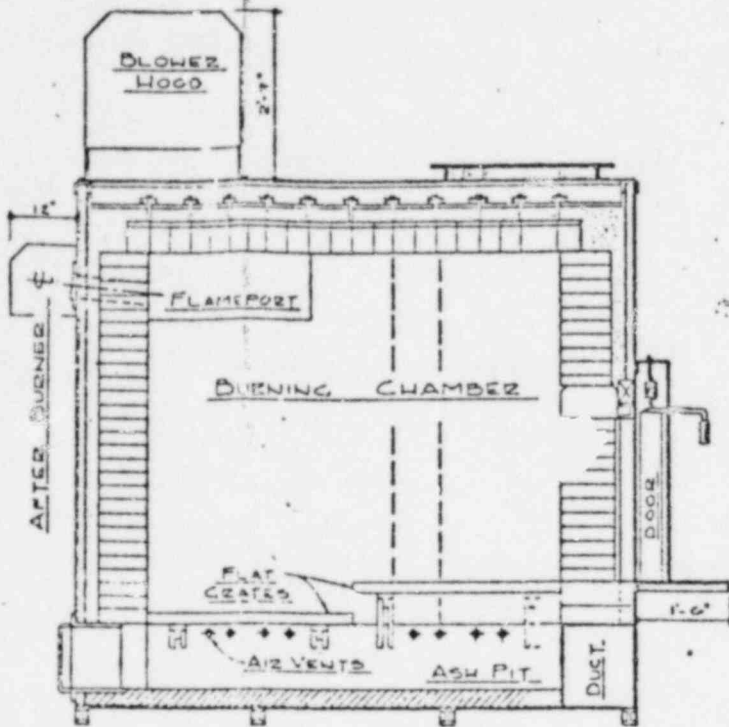
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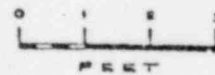
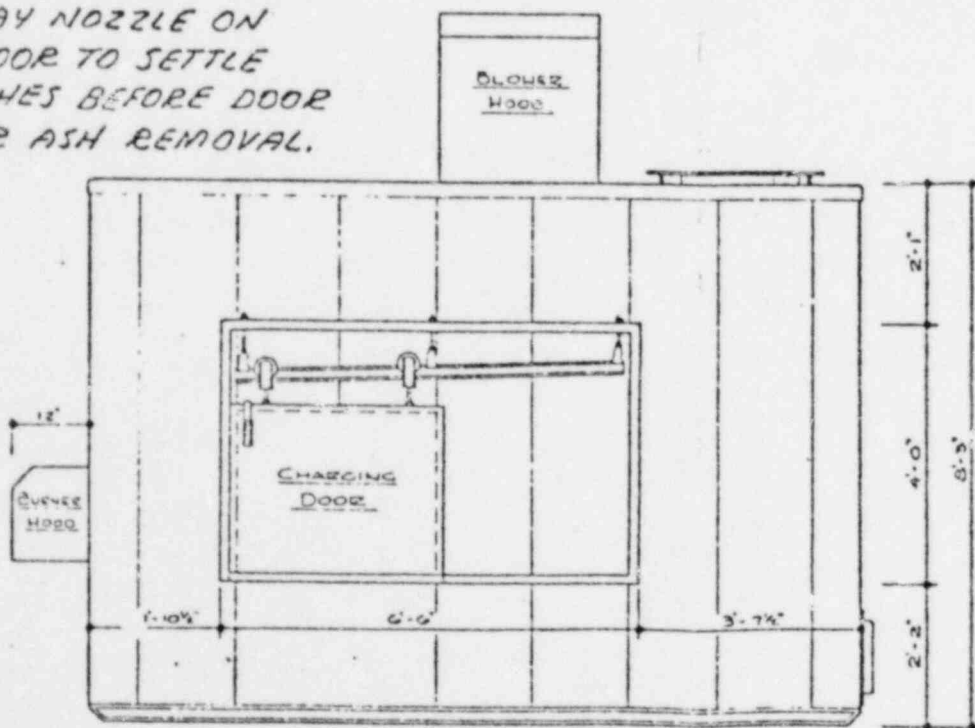


SECTION B-B



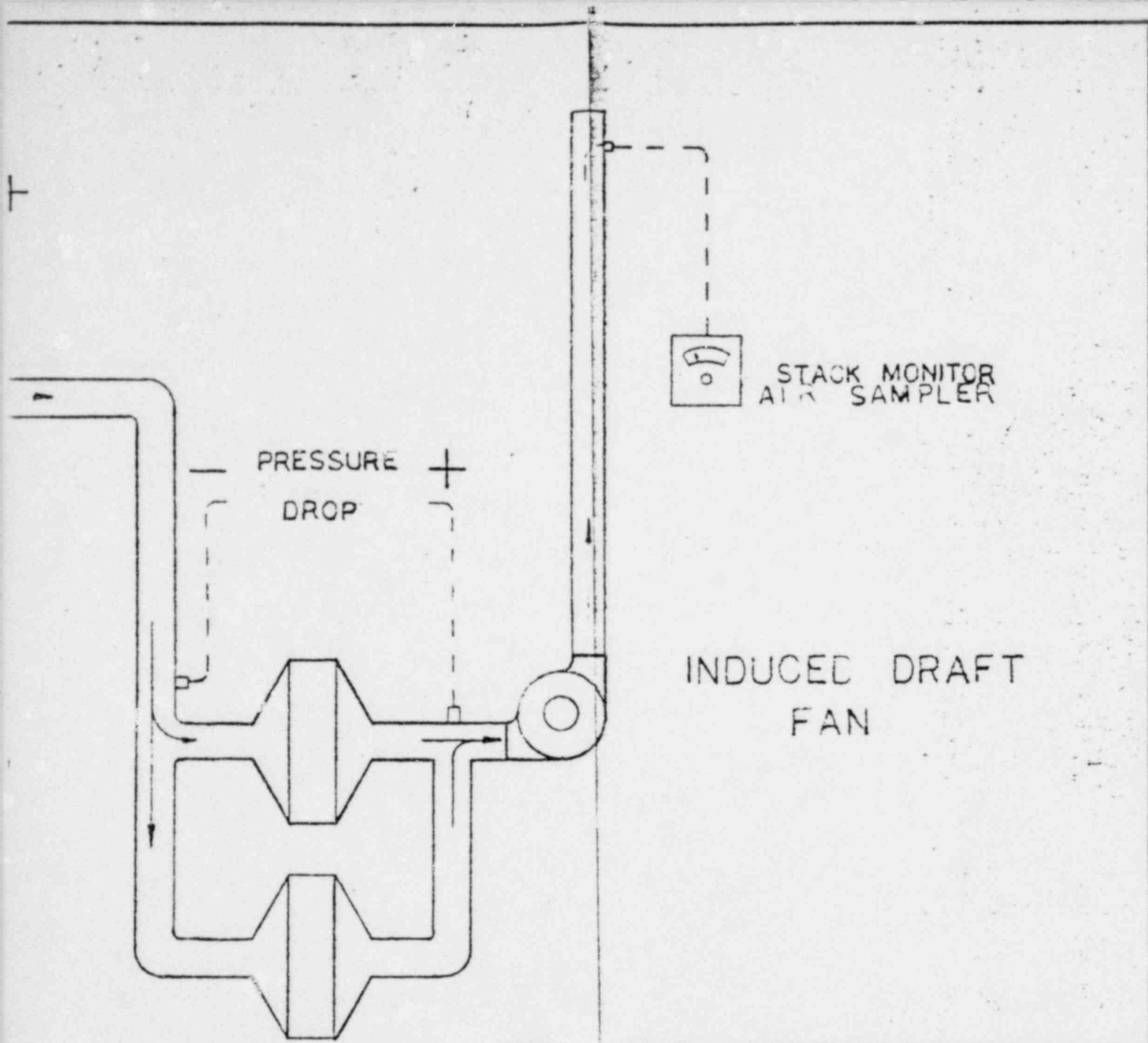
SECTION C-C

SPRAY NOZZLE ON
OF DOOR TO SETTLE
ON ASHES BEFORE DOOR
FOR ASH REMOVAL.



FRONT ELEVATION

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| FEDERAL INCINERATORS INC. | | |
| REG. U.S. PAT. OFF. | | |
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PROPOSED WEST CHICAGO WASTE INCINERATOR SCHEM.

SCALE

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| L.J.H | 3-4-80 |
| CHECKED BY | DATE |
| <i>[Signature]</i> | 3-4-80 |
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KERR-MCGEE

KM DIVISION LOCATION **15493**

DRAWING NUMBER **AT-W.G.-01** REV.

