

MI.1-4



Research Laboratories
General Motors Corporation
General Motors Technical Center
Warren, Michigan 48090

January 21, 1977

Occupational Health Standards Branch
Office of Standards Development
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. Robert E. Alexander, Chief

Dear Mr. Alexander:

In 1974, General Motors Corporation acquired a manufacturing plant in Adrian, Michigan. On October 21, 1976, General Motors announced that work would begin immediately to prepare the plant for manufacturing operations (Appendix A).

A news release, made by Mr. Irving Loop of ERDA and carried by radio station WABJ of Adrian, Michigan on May 11, 1976, stated that natural uranium was handled in the plant after World War II and that residual radioactivity may still be present in the plant. Based on this news release, General Motors initiated a radiation survey of the plant which was conducted on May 27, 1976. Details of the radiation survey and subsequent cleaning operations are presented in Appendix B.

As indicated in Appendix B, a "reasonable effort" has been made to eliminate residual contamination in the plant. All loose radioactive material that could become airborne has been removed; areas indicating concentrations of fixed radioactivity have been scraped and chipped. While trace amounts of fixed radioactivity can still be detected in expansion joints and cracks in the floor, they are below the levels specified in paragraph 20.105 PART 20 of the NRC Rules and Regulations.

Because of public concern associated with this plant (initiated by the ERDA news release), and because of the need to get this plant in operation, we request that a final survey and release be made of the plant for unrestricted use.

Respectfully,

A handwritten signature in black ink that reads "Robert F. Hill". The signature is written in a cursive, slightly slanted style.

Robert F. Hill
Radiation Safety Officer
Analytical Chemistry Department

RFH/jg

Encl.

APPENDIX B

RADIATION SURVEY OF THE CHEVROLET PLANT IN ADRIAN, MICHIGAN

PURPOSE

The purpose of this report is to document the findings of a radiation survey and a subsequent cleanup of the Chevrolet plant in Adrian, Michigan. (The survey was conducted at the request of the Chevrolet Motor Division.)

SUMMARY

1. A radiological survey of the Chevrolet plant in Adrian, Michigan, was conducted on May 27, 1976. The portion of the plant that was previously devoted to the extrusion of natural uranium was found to contain dust with amounts of radioactivity that exceeded permissible radiation levels.
2. Based on the survey, it was recommended that the contaminated dust be removed from the plant. The cleaning operation was accomplished in July, 1976; specific radiological cleaning procedures were followed. The contaminated material removed from the plant was shipped to the National Lead Company for disposal.
3. A final radiological survey was conducted by the US Energy Research and Development Administration (ERDA) in August, 1976. Although a final report from ERDA is not expected until January, 1977, ERDA representatives anticipate that the plant will be judged 'clean' with no restrictions.

Report by Robert F. Hill
October 26, 1976

INTRODUCTION

Chevrolet Motor Division recently acquired a manufacturing plant in Adrian, Michigan. The previous owners had conducted uranium extrusion operations in specific locations within the plant for the Atomic Energy Commission during the period of 1953 to 1962.

The Energy Research and Development Administration has expressed concern about the possible existence of radiation from trace amounts of uranium that may remain in such plants (1). While the plant was defined as "clean" following the termination of the uranium operations, the standards for decontamination of such facilities have been tightened considerably since the 1960's. Thus, it was thought prudent to conduct an extensive radiation survey in compliance with present radiation standards to update existing radiological records and to assure that previous cleanup activities in the plant removed all significant quantities of uranium. The radiation survey was conducted on May 27, 1976.

Standards for Protection Against Radiation

The permissible levels of radiation in unrestricted areas due to radioactive materials are defined in PART 20, Code of Federal Regulations (2). Two types of radiation hazards from radioactive materials must be considered, namely, 1) airborne and 2) contaminated surfaces.

Airborne Radioactive Material: Airborne radioactive material means any radioactive material dispersed in the air in the form of dust, fumes, mists, vapors, or gases. The maximum permissible concentration of airborne natural uranium in an unrestricted area is 0.007 milligram per cubic metre of air (2). Since the specific activity of natural uranium is 6.77×10^{-11} microcurie per gram ($\mu\text{Ci/g}$), the airborne limit for an unrestricted area is $5 \times 10^{-12} \mu\text{Ci/cm}^3$ of air.

Surface Contamination: The limits for surface contamination due to natural uranium are 5,000 dpm/100 cm^2 total radioactivity, and 1,000 dpm/100 cm^2 removable radioactivity* based on counting alpha particles.

EXPERIMENTAL

Location of Uranium Operations

A sketch of the plant layout is shown in Appendix A. The uranium operations were confined to a portion of the plant occupying Bays 5, 6, and 7, and Units A, B, C, D, and one-half of E; this floor area is 4,000 m^2 (180 ft by 240 ft). Although none of the original equipment used in the uranium operations remained in the area, their foundations were evident. The original power transformer, electrical distribution gear, and crib, however, were still intact.

* Disintegrations per minute (dpm) are determined by wiping an area of 100 cm^2 with dry filter or soft absorbent paper.

Radiation Survey

Four types of radiation surveys were conducted, namely, 1) air-filter samples, 2) surface wipe tests, 3) alpha and beta-gamma monitoring, and 4) radioassay of dust and dirt samples.

Air-Filter Samples: A Staplex high-volume air sampler was used to sample a large volume of air for particulate matter. The air flow rate was maintained at 0.03 m³/s for 1 hour; the total volume of air sampled was 110 m³. Ashless filters, type TFA-810, were used; these filters have good collection efficiency for particulates as small as 0.01 micron. The radioactivity collected on the filters was determined by both alpha and gamma counting; a gas flow proportional chamber was used for alpha counting, and a NaI(Tl) scintillation detector was used for gamma counting.

Surface Wipes: Whatman No. 1 filter papers (42-mm diameter) were used to wipe 100 cm² test areas of the plant for removable radioactivity. The wipe samples were evaluated for radioactivity by alpha counting in a gas flow proportional chamber.

Alpha and Beta-Gamma Surveys: The plant floor was surveyed for total radioactivity by alpha and beta-gamma counting with portable instruments. The instruments (Eberline PRM5-3 AC-3-7 for alpha surveys, and Nuclear Chicago 2650 for beta-gamma surveys) were calibrated with uranium and plutonium standards.

Dust Samples: Samples of dust and/or dirt were selected at random from various regions of the plant and evaluated for uranium content by gamma counting in a NaI(Tl) scintillation well detector. Through the use of uranium nitrate counting standards, the weight of uranium per gram of sample was determined.

RESULTS AND DISCUSSION

Initial Radiation Survey

The initial radiation surveys were made on May 27, 1976, prior to any cleaning operations. Of main concern was the portion of the plant in which the uranium extrusion operations were conducted. The results of the surveys are as follows:

Air Filter Samples: Three air filter samples were taken, two with the air circulating fans off and one with all of the air circulating fans on. The amount of airborne uranium collected on the filter samples was less than 5×10^{-15} $\mu\text{Ci}/\text{cm}^3$. This is 0.1% of the maximum permissible level for an unrestricted area. It appears that routine air movement within the plant did not cause any airborne radioactive material hazard.

Surface Wipes: The surface wipe samples obtained from various sections of the plant floor indicated that some radioactive material did exist in the portion of the plant where uranium was handled. The removable radioactivity on the wipe samples varied from 1 to 1300 dpm/100 cm²; the highest being 30 percent above the maximum permissible level for removable radioactive material.

Alpha and Beta-Gamma Surveys: Portable instruments were used to survey various locations within the plant for total radioactivity. Several of the surveys along the equipment foundations and in the transformer crib revealed radiation fields as high as 10 mr/h at 1 cm.*

Dust Samples: To evaluate specific areas more completely, dust and/or dirt samples were obtained and radioassayed for uranium content. The uranium concentration ranged from 2 to 241 milligrams of uranium per gram of sample (mg/g) obtained along the equipment foundations. Dust samples taken from the steel roof supports above the transformer crib contained a maximum of 33 mg/g.

These surveys indicated that residual amounts of uranium remained in the original areas devoted to uranium processing. Since future plans call for scraping and painting all steel superstructures, it was recommended that the uranium containing dust and dirt be removed by vacuum cleaning techniques. While the undisturbed uranium debris presents no health hazard, poor cleaning techniques could easily cause the dust to become airborne resulting in uranium concentrations in excess of 5×10^{-12} $\mu\text{Ci}/\text{cm}^3$.

Cleaning Operations

The uranium containing dust on the steel roof supports and on the floor was removed by vacuum cleaning techniques during July, 1976. An industrial vacuum cleaner with plastic disposable bags was used; the exit air from the cleaner was passed through an absolute filter prior to exhausting into the atmosphere.

The vacuum cleaner operator wore coveralls, shoe covers, gloves, a head cover, and an approved** Welsh dual element respirator. Air-filter samples were taken both in the vicinity of the operator and at floor level during the cleaning operations. The radioactive material collected on the air-filter samples did not exceed 8×10^{-12} $\mu\text{Ci}/\text{cm}^3$ indicating that the vacuum cleaning operation was accomplished in a safe manner.

The total weight of dust removed from the roof supports was 866 kg (1905 lb) with a total uranium content of 3.9 kg. The uranium concentration of the dust varied from a high of 33 mg/g in the region above the transformer crib to a low of 0.4 mg/g along the outside (north) wall.

* An end window probe (window thickness of 1.8 mg/cm²) was used and held 1 cm from the surface being monitored.

** Approved by National Institute of Occupational Safety and Health.

All areas of the floor indicating radioactive material were vacuum cleaned. Areas of the floor that had radiation fields higher than 0.4 mr/h were scraped, chipped, and vacuumed until the major portion of the radioactivity was removed. A total of 375 kg of material which contained an estimated 2 kg of uranium was removed from the floor. Wipe tests of all areas after the cleaning operation indicated removable radioactivity below 100 dpm/100 cm², which is 10% of the maximum allowable limit.

In addition to the contaminated dust and solid debris removed from the plant, sections of stack ducts that once were used to vent the equipment were found to be contaminated with uranium. Dust samples removed from the inner surfaces of the stack ducts had uranium concentrations varying from 45 to 162 mg/g. Thus, the stack ducts, which contained an estimated 2 kg of uranium, were removed from the plant and packaged for waste disposal.

In all, eight steel drums containing 1241 kg (2730 lbs) of dust and solid debris, and six stack duct packages weighing 938 kg (2064 lbs) were shipped to the National Lead Company of Ohio (an ERDA prime contractor) on October 5, 1976, for disposal. The following were involved in the cleaning and packaging operations:

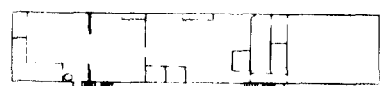
R. L. Kelly	Chevrolet - Adrian
D. Aldorfer	Chevrolet - Warren
R. J. Bielewski	Chevrolet - Warren
J. G. Daly	Chevrolet - Warren

ERDA Inspection

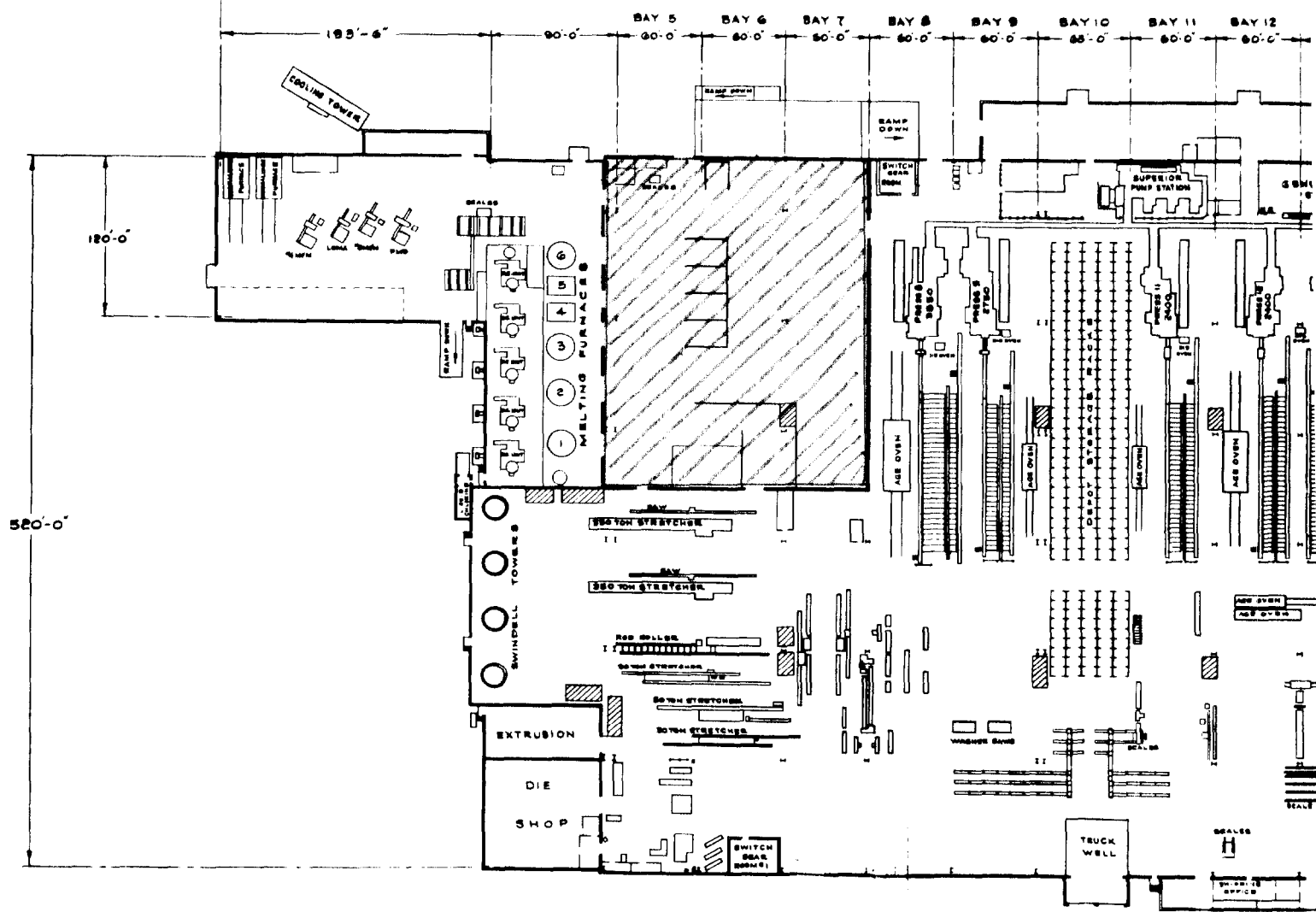
After completion of the cleaning operation, it was requested that ERDA conduct a final radiological survey of the plant. The following were involved in the survey conducted over a three-day period, August 17-19, 1976:

W. T. Thorton	US ERDA	Oak Ridge, Tenn.
J. Burden	Oak Ridge National Labs.	" " "
F. Haywood	" " " "	" " "
D. R. Stone	" " " "	" " "
M. R. Schaeffer	Reactive Metals Inc.	Ashtabula, Ohio
J. Camburn	Department of Health	State of Michigan

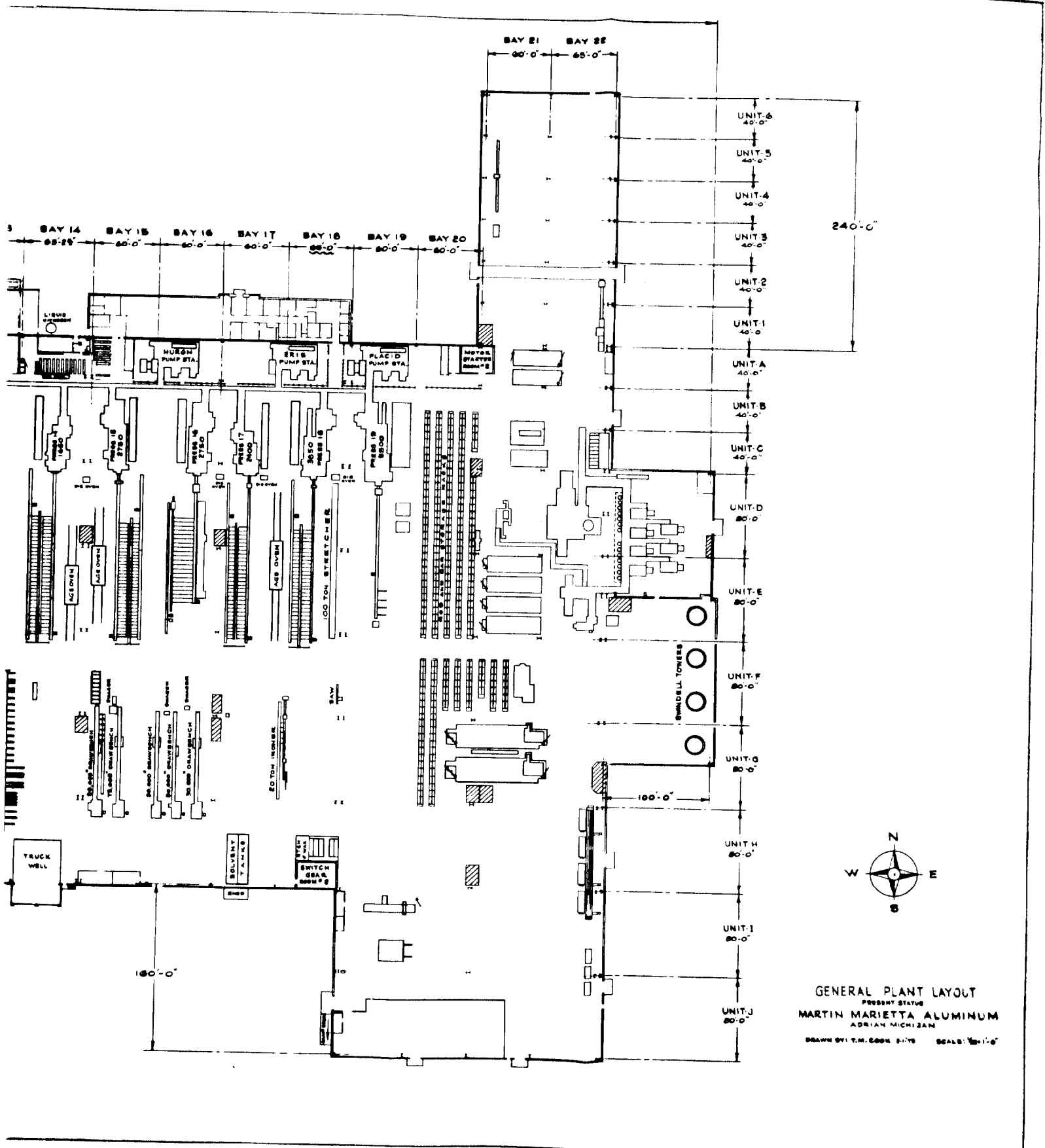
The results of the survey were submitted to ERDA in Washington D.C. on October 8, 1976, for their review and recommendations. A final report from Washington is not expected until January, 1977, but it is anticipated by the ERDA regional office in Oak Ridge, Tennessee, that the plant will be judged 'clean' with no restrictions of any type.



ROOMS ABOVE GENERAL STORE & STORAGE AREA



PLANT LAYOUT



GENERAL PLANT LAYOUT
PRESENT STATUS
MARTIN MARIETTA ALUMINUM
ADRIAN MICHIGAN
DRAWN BY T.M. COOK DATE SCALE: 1/4" = 1'-0"

REFERENCES

1. "Chementator", Chem. Eng., 83, 70(June 21, 1976).
2. Rules and Regulations, United States Nuclear Regulatory Commission, Title 10, Code of Federal Regulations, 20-1(1975).



GENERAL MOTORS CORPORATION

General Motors Building, Detroit, Michigan 48202

556-2030 Area Code 313

NEWS

For Release

IMMEDIATELY, THURSDAY, OCTOBER 21, 1976

DETROIT -- Chairman Thomas A. Murphy of General Motors announced today that work will begin immediately to prepare the Chevrolet Motor Division plant at Adrian, Mich., for manufacturing operations.

Mr. Murphy said Chevrolet will begin production of plastic automobile components at the plant early next year. The plant will employ about 175 workers by late summer, 1977.

The GM chairman noted that the Adrian plant announcement is but one of several projects announced recently as part of GM's multi-billion dollar capital expenditure program in the United States.

Among other recently-announced projects are resumption of major expansion and modernization programs at the Oldsmobile and Fisher Body divisions in Lansing; resumption of an unfinished addition at the Buick assembly plant in Flint; a two-phase construction project adding to facilities at the Chevrolet aluminum die casting plant at Massena, N.Y.; a major conversion of GMC Truck & Coach facilities in Pontiac, Mich., to accommodate van production and major additions to the Delco Products' Kettering, Ohio and Delco Electronics Division facilities in Kokomo, Ind.

Mr. Murphy said GM will spend an estimated \$3 billion on plants, equipment and tooling in 1977, a record amount, with approximately 80 percent of the spending to be in the U.S. He said GM capital spending in 1976 will total about \$2.4 billion.

Approximately 350,000 square feet of the Adrian plant's total 813,000 square feet will be utilized for the plastic component production. The remaining space will be available for future production considerations.

Installation of the first equipment -- new injection molding machines, is scheduled for January with production expected to begin in April. Later, additional

molding machines currently in use at the Chevrolet Pressed Metal Plant, in Flint, Mich., will be moved to the Adrian plant.

Production and clerical employes from the Chevrolet Flint Pressed Metal Plant, who will be affected by the transfer of operations to Adrian, will be offered jobs in Adrian. Additional personnel will be hired in Adrian as needed.

Chevrolet purchased the Adrian facility from Martin Marietta in September, 1974. It has been utilized for parts and equipment storage since that time.

* * *

NEWS RELEASE

An official reiterated yesterday that the possibility of radio activity being present in the somewhat jinxed GM plant on East Beecher Street is very minimal.

Irving Loop of the Energy Research and Development Administration (ERDA) said that his agency just wants to be absolutely sure that no problem exists.

"If it is important enough we will go check it; however, we would be very suprised if we did find any problem. Now let me say, by problems, we would be suprised if we found anything that would effect peoples health and safety. We might find things we want to clean up just because we're very clean. You have to consider what would happen over hundreds of years and this kind of thing but the likelihood of finding anything that is an immediate problem is remote".

Loop said the reason the government is just now checking out these sites, for possible radiation debris, is that ERDA is operating under new stringent standards.

"All these sites were cleaned up but the standards have changed in the past thirty years and we thought it prudent to go check them again".

Of the fifty sites nation wide, Loop said the Adrian Location, the former Bridgeport Brass Company, is low on the inspection priority list.

"We only handled natural uranium there; nothing that would not be found in nature. That doesn't necessarily make it OK because even people in uranium mines have to take special precautions because of the natural activity can be of concern and that's all there would be at Adrian, Michigan. None of the products of the nuclear area, so to speak".

The Adrian Plant was leased from the Air Force during World War II for metal extrusion operation.

The city of Adrian voiced their concern on the matter hoping the government plans to inspect the area before its projected 1978 date. According to Loop he believes that if enough pressure were put on Washington an inspection may be expidited by ERDA.

Source: Adrian Radio Station, WABJ
8:00 AM Broadcast
May 11, 1976