

04000017

SURVEY PLAN FOR DOW CHEMICAL,
BAY CITY, MICHIGAN

I. Introduction and Site Description

In the 1950's Dow Chemical Corporation operated a chemical plant in Bay City, Michigan and used thorium metal and/or compounds to prepare magnesium alloys. In the early 1960's, Wellman Dynamics Corporation took over the facility. They were issued a license authorizing use of source material in the manufacture of thorium-magnesium alloy casings. The alloys, containing less than 4% thorium by weight, were produced from a master alloy containing 40% thorium by weight. Wellman's operations, which included casting, sandblasting, sawing, grinding, sanding, and polishing, were conducted primarily in Buildings 6, 7, 11, and 15 (see Attachment). Wellman requested termination of the license and release of the site for unrestricted use in April 1972. This license was terminated in May 1972 and the site reverted to Dow Chemical Corporation.

The site was sold in 1974 to Dore Wrecking Company (now Dore Enterprises, Inc.). Dore razed several buildings and others are currently occupied: Building 1 by Aerospace America, Inc., a subsidiary of Dore; Building 10, by Kerkau Manufacturing Company; Building 11 by York Electrical Company; and Building 15, by General Housing Corporation. Dow Chemical presently uses Building 13 for storage.

Several areas were identified as being contaminated by NRC inspectors: contaminated soil and rubble near Buildings 4 and 5; and magnesium-thorium plates and other scrap metal in Buildings 1 and 10. These areas were to be cleaned and a confirmatory survey done in order to confirm that the site is suitable for release for unrestricted use. There is a possibility that four drums containing sludge with low thorium content were buried in the area

Prepared by the Manpower Education, Research, and Training Division of Oak Ridge Associated Universities, Oak Ridge, TN, under interagency agreement DOE No. 40-816-83, NRC Fin. No. A-9076-3, between the Nuclear Regulatory Commission and the Department of Energy.

August 17, 1984

between Buildings 7 and 15. Also, an area offsite has been identified as being contaminated.

II. Purpose

The purpose of this survey is to provide the necessary data to evaluate the radiological conditions of the site relative to criteria for release for unrestricted use.

III. Responsibility

Work described in this survey plan will be performed under the supervision of Mr. J. D. Berger, Certified Health Physicist, with the Radiological Site Assessment Program of the Manpower Education, Research, and Training Division of Oak Ridge Associated Universities.

IV. Procedures

A. Gridding

A 20 meter grid will be established over a 305m x 152m area on the Dore property. This area is indicated on the attached map.

The area off-site is approximately 30m x 30m and will be divided into 10 m grids.

Buildings 1 and 10 will not be gridded.

B. Direct Measurement

1. Walkover scans will be conducted over both outdoor areas and Buildings 1 and 10, using portable gamma scintillation detectors and ratemeters. Locations of elevated contact radiation levels will be noted.

2. Gamma exposure rate measurements will be made at the surface and at 1 m above the surface at each gridline intersection and at locations of elevated contact radiation levels in both outdoor areas. In Buildings 1 and 10, measurements will be made at contact and at one meter at locations of elevated contact radiation levels.
3. Beta-gamma dose rate measurements at 1 cm above contact will be made at each of the locations where gamma exposure rate measurements were performed.

C. Sampling

1. Surface soil samples (0-15 cm) will be collected where possible from each gridline intersection and at locations of elevated contact radiation levels in both outdoor areas.
2. Boreholes will be drilled at locations of elevated contact radiation levels, in the outdoor areas. The exact number and locations will be selected based on the information generated during the walkover surveys. These holes will be drilled to ground water or bedrock.
3. Ground water samples will be collected from boreholes when available.
4. Samples of surface water will be obtained from sources in the outdoor areas which are available at the time of the survey.
5. Smears for transferable surface contamination will be obtained from any locations of elevated contact radiation levels identified in Buildings 1 and 10.

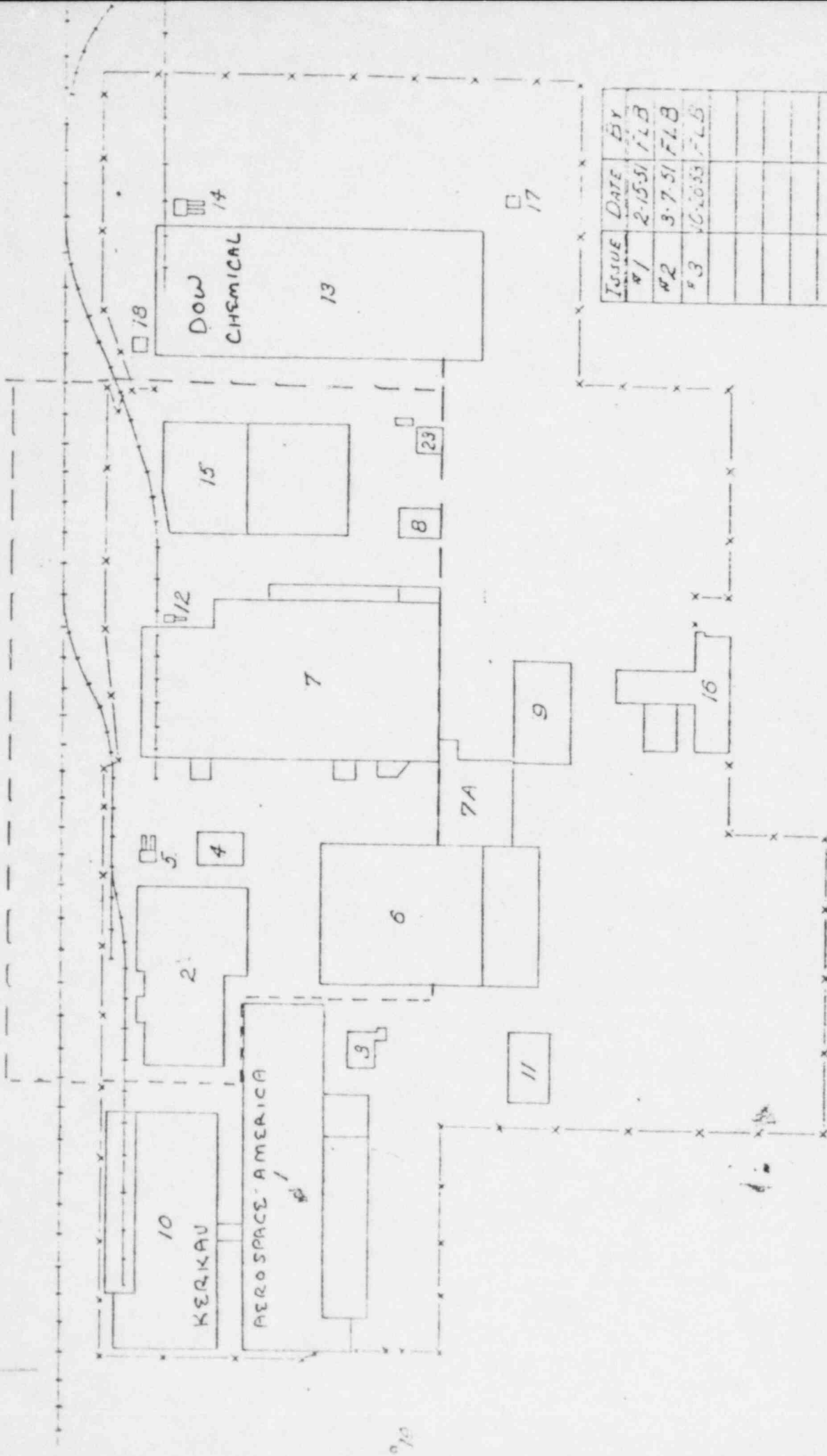
D. Background and Baseline Determinations

Information collected from the SCA survey in Bay City will be used, and no new information will be collected.

V. Sample Analysis and Interpretation of Results

All samples and data will be returned to the ORAU laboratory, Oak Ridge, TN, for analysis and interpretation. Radionuclides of concern are members of the natural thorium and uranium decay series; however, spectra will be reviewed for the presence of other identifiable radionuclides.

Water will be analyzed for gross alpha and gross beta levels; isotopic analysis will be performed if gross concentrations exceed EPA drinking water standards.



ISSUE	DATE	BY
#1	2-15-51	FLB
#2	3-7-51	FLB
#3	10-10-51	FLB

- - - INDICATES AREA TO BE GRADDED.
 BUILDING LOCATION PLAN.
 Scale: 1"=200'0"

DOW CHEMICAL U.S.A.

November 7, 1983

MICHIGAN DIVISION
MIDLAND, MICHIGAN 48640

Mr. George W. Bruchmann, Chief
Radiological Health Services Division
MI Department of Public Health
3500 Logan
P.O. Box 30035
Lansing, MI 48909

cc: B. Kosla, U.S. NRC, Washington, D.C.
M. Schumacher, U.S. NRC, Glen Ellyn, IL

RE: SAMPLING MIDLAND THORIUM

Dear Mr. Bruchmann:

This is in response to your September 20, 1983 letter (copy attached) commenting on the Dow proposed sampling plan for the Midland Thorium Storage Site. I have reviewed your comments and suggestions and intend to implement them in our evaluation plan.

We have marked the proposed boring locations per your plan. The clay cover over the boring location will be removed prior to boring. If during the course of boring we run into non-borable objects (such as cement blocks) we may need to rebore in close proximity to the original location. If this occurs we will pick up sampling at the level of the previous bore.

Regarding the composite sampling collection, we intend to follow your recommended increments of 0-6", 6-12" for the first foot, one foot from one to ten feet and two feet to an appropriate depth. The samples from the first foot will be taken by hand. Appropriate mixing techniques will be used to assure that the samples are representative.

Samples will be collected in sample tins and dried prior to analysis. The tins will be sealed at least 2 days to allow for equilibrium.

We will screen the sample containers with a micro-R meter in a low background area.

NOV 14 1983

I-18



Mr. George W. Bruchmann
November 7, 1983
Page 2

We intend to initiate the sampling the week of November 7, as I indicated in a phone conversation with Joe Hennigan, of your Department on October 31. On November 4 a three party phone discussion of the proposed sampling was held between Marty Schumacher, Joe Hennigan and myself. We agreed on the basic sampling strategy and that on Tuesday, November 15, Joe would come to Midland and we would hand sample the first foot of soil in close proximity to the indicated sample locations. These samples would be split.

If you have any questions or need further information please contact me.

Ric Olson

R. A. Olson
Environmental Services
628 Bldg.
(517)636-3916

RAO/yv

Attachments



JAMES J. BLANCHARD, Governor

DEPARTMENT OF PUBLIC HEALTH

3500 N. LOGAN

P.O. BOX 30035, LANSING, MICHIGAN 48909

GLORIA R. SMITH, Ph.D., M.P.H., F.A.A.N., Director

September 20, 1983

Mr. R. A. Olson
Dow Chemical Company
Industrial Hygiene Services
474 Building
Midland, Michigan 48640

Dear Mr. Olson:

We have reviewed the Dow plan for evaluating the thorium concentration in the 159' by 300' area (north of the Shot Pond) at the Dow Chemical Company Midland plant site. In principle, we agree with the proposed evaluation plan, submitted to us by Randy Croyle on March 25, 1983. However, as discussed during telephone conversations and at our brief May 11 meeting, we have some concerns regarding the selection of boring locations, composite sampling intervals, and sample preparation prior to gamma spectral analysis.

Figure 1 of the Dow plan shows a 20 $\mu\text{R/hr.}$ contour surrounding the 159' by 300' area and a grid of exposure rate readings ($\mu\text{R/hr.}$) within the area. It also delineates eight proposed boring locations to be used for sample collection. In an attempt to better characterize the radiation exposure levels within the area, we have redrawn the figure and plotted exposure level contours for 50 $\mu\text{R/hr.}$, 100 $\mu\text{R/hr.}$, and 200 $\mu\text{R/hr.}$ (see Attachment 1). To accomplish this, we assumed all grid points were equally spaced along north/south and east/west lines and used linear interpolation between adjacent points to calculate the positions of the contours. A set of eight proposed boring locations are indicated on our drawing as red-lined squares. In addition, we suggest that a minimum of two boring locations be added outside of the area (preferably at least 50' away from the area). Samples from the two borings would be used to determine the vicinity background.

Concerning composite sample collection, we recommend that a different set of sampling intervals be used. We suggest sampling intervals of 0-6", 6-12", each foot from one to 10 feet, and then each 2 feet to an appropriate depth. Screening of the composite samples with a micro-R meter and visual examination during the sample collection process will aid in determining the appropriate sampling depth and in defining the depth of the thorium-contaminated soil. Depending upon the screening

results, some of the samples may be combined to decrease the number of samples to be analyzed. We are interested in obtaining a limited number of split samples, and the Nuclear Regulatory Commission may also wish to be involved in the sampling and analysis activities.

Regarding sample preparation prior to gamma spectral analysis, samples should be dried before analysis. Also, soil samples should be sealed for at least 2 days after drying and prior to counting. This will assure that the secular radioactive decay equilibrium between ^{232}Th and its daughters is not changed by loss of ^{220}Rn during the collection and preparation processes.

Please advise us of your future intent regarding proposed thorium evaluation and disposition. If you have any questions concerning this review, do not hesitate to call.

Sincerely,

ENVIRONMENTAL AND OCCUPATIONAL
HEALTH SERVICES ADMINISTRATION



George W. Bruchmann, Chief
Radiological Health Services Division

GWB/RDdh

cc: John G. Davis, NRC
Bill Menczer (letter only)

