

GENERAL DESCRIPTION OF SITE

The Reilly site was operated as a disposal area from at least 1980 until 1987. For approximately two years, from 1980 to 1982, this included the disposal of hazardous waste from Gra-Iron Foundry Inc., Marshalltown, Iowa.

The site was previously part of a larger tract of land that was used for agricultural purposes. However, sometime before 1980 it became a small isolated area between a road and two railroad right-of-ways. Before the start of disposal activities, the Iowa Department of Transportation used the site as a borrow pit.

This triangle-shaped site is fairly flat and covers about 3 1/2 acres of land. The site was filled in from Beer Garden Road on the east and from a Chicago and Northwestern rail line on the south. There is a low area between the fill area and the spur rail line that forms the northwest boundary of the site. The surrounding terrain slopes north towards the nearby floodplains of Linn Creek and the Iowa River. There is drainage access into the site from under the railroad tracks on the south and out of the site from under the railroad tracks to the north. Figure 1 is a topographic map of the Reilly site. This map shows the direction of surface water flow through the site and the location of fill within the site.

The site is located on the east side of Marshalltown in the Center of the West Half of Section 31, T84N, R17W, Marshall County, Iowa. Although the site is within the city limits, the nearest residential neighborhood is about a quarter mile to the west. Figure 2 is a topographic map of the area around the Reilly site.

CURRENT OWNER

The site is owned by Robert Reilly. Disposal of hazardous waste from Gra-Iron Foundry occurred while the property was leased to Construct, Inc.

LEGAL DESCRIPTION

Lot Twenty-two (22) and Lot Twenty-four (24) of the Subdivision of the Southwest Quarter (SW 1/4) of the Northwest Quarter (NW 1/4), and that part of the Northwest Quarter (NW 1/4) of the Southwest Quarter (SW 1/4) lying North of the railroad right of way, all located in Section Thirty-One (31), Township Eighty-four (84) North, Range Seventeen (17) West of the 5th P.M., Marshall County, Iowa.

(Reilly Dump Site)

GEOLOGIC AND HYDROGEOLOGIC SETTING

SURFACE WATER

The Reilly site is located close to, but above, the floodplain of the Iowa River. The surrounding land slopes north and east towards this floodplain. South of the railroad track boundary there appears to be 40 to 60 acres of land that has surface drainage directed through the site (USGS, 1980). The direction of this surface water flow through the Reilly site is shown in Figure 1.

After exiting the site, it appears that surface water flows north for about 2/3 of a mile until it enters Linn Creek (USGS, 1980). Linn Creek enters the Iowa River a half mile to the east. These nearby surface water features are shown on Figure 2.

GEOLOGY

From one drill hole and from information obtained from the Iowa Geological Survey, Gra-Iron has developed a regional geological cross section for the area. This cross section shows glacial drift, at depths over three hundred feet, immediately to the east of the site. The lower part of this "drift" is the Poweshiek buried-channel aquifer. The upper part is the alluvial aquifers of the Iowa River floodplain (Twenter & Cobble, 1965). This geological cross section is shown in Figure 3a. The surface location of this geological cross section is shown in Figure 3b.

Based on a nine borehole drilling program, Gra-Iron has developed a partial geological profile of the glacial drift beneath the Reilly site. The stratigraphic cross section from the boring logs indicates that the waste foundry sand and combined cupola dust cover the disposal area and are up to 13 feet deep near the center. The cross section indicates that the waste material is underlain by a sandy clay which is approximately four feet thick (Hickok, 1986a). However, Gra-Iron did not collect enough information to define the vertical and horizontal boundaries of the uppermost aquifer beneath the waste (Jacob, 1986). They also did not provide information about the relationship of these features to the nearby alluvial and buried channel aquifers.

GROUNDWATER

The Marshalltown public water supply is drawn from wells in three aquifer systems on the north side of the Iowa River. This includes a shallow sand aquifer, and deep sand aquifer and a limestone aquifer connecting both of the sand aquifers together (Layne, 1983). This well field is about two miles northwest of the Reilly site. This location is both upstream and on the opposite side of the river from the Reilly site. It is likely that all Marshalltown businesses and residences west of the Reilly site are on the public water supply system.

Residences and businesses east of the Reilly site may get their drinking water from private wells in the Iowa River alluvial aquifer or the Poweshiek buried-channel aquifer. The nearest ap-

(Reilly Dump Site)

parent residence (USGS, 1980), which may have a private well, is 1400 feet to the east. There appears to be seven other residences within one mile of the east side of the Reilly site.

Gra-Iron has presented a determination that groundwater flow in the uppermost aquifer is from southeast to northwest (Hickok, 1986c). However, this determination was not supported by enough information to adequately define groundwater flow patterns in the area of the site (Roberts, 1986). The location of the surficial aquifers that provide water to the Marshalltown area are shown in Figure 4.

SITE HISTORY

Prior to disposal activities, the site was used as a borrow pit for road construction materials by the Iowa Department of Transportation. Following abandonment of the site as a borrow pit, it was used as a local dumping area (Jacobs, 1986). Before the property was leased to Construct, Inc., it was operated by Trowbridge Construction (Cook, 1982a).

Construct, Inc. contracted with Gra-Iron to dispose of foundry sand and baghouse dust at this site beginning August 1, 1980 (Turkle, 1982a). Disposal of baghouse dust may not have started until November 21, 1980 (Hickok, 1986a). This co-disposal of foundry sand (non-hazardous waste) and baghouse dust (hazardous waste) stopped after July 19, 1982 (Jacobs, 1982). Gra-Iron Foundry violated both hazardous waste and solid waste disposal regulations with this disposal practice.

Sometime between January 20 and March 4, 1981, Gra-Iron became aware that their baghouse dust was a hazardous waste (UHL, 1981 & Shive-Hatterly, 1981a). After this occurred they should have sent their baghouse waste to an authorized hazardous waste disposal site. This issue was first raised by the department in June 1981 (Squibb, 1981a). By October 1981, Gra-Iron was making arrangements to dispose of the baghouse dust at the Blackhawk County Landfill (Authorized Hazardous Waste Disposal Site). The company appeared to have stopped disposal of their baghouse dust at the Reilly dump site (Squibb, 1981b).

However, during the next inspection in May 1982, the department learned Gra-Iron was continuing to dispose of baghouse dust at the Reilly site (Turkle, 1982a). This unlawful disposal appears to have continued until late July 1982 (Jacobs, 1986), when Gra-Iron received a strongly worded enforcement letter from the department (Anderson, 1982). There is conflicting information that this disposal stopped approximately April 30, 1982 (Hickok, 1986a).

On September 10, 1982, Gra-Iron obtained a lease to use the Reilly site for the disposal of foundry sand (Cook, 1982b). With this lease, Gra-Iron disposal of foundry sand was in compliance

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with the solid waste regulations. Gra-Iron appears to have maintained the lease and the disposal of waste foundry sand until its bankruptcy in 1987 (Jacobs, 1986).

The department's May 1982, enforcement letter also informed Gra-Iron that they had to close the Reilly Dump Site according to the hazardous waste closure regulations. Their closure plan was supposed to be submitted by August 15, 1982.

On November 12, 1985, the department was granted a Consent Order, Judgement and Decree against Gra-Iron Foundry (State of Iowa, 1985). As a result of this court action, Gra-Iron began the process of closing the Reilly dump site.

In January 1986, Gra-Iron submitted a closure and post-closure plan for the Reilly site (Hickok, 1986a). The review by the department and EPA noted serious deficiencies in this plan (Hall, 1986a; Sanderson, 1986).

In June 1986, Gra-Iron submitted reports on a groundwater assessment (Hickok, 1986c) and a proposal for final remedial action at the site (Hickok, 1986d). The conclusion of the groundwater report were rejected by the department because of inadequate groundwater monitoring data (Roberts, 1986). The proposal for final remedial action could not be evaluated without an adequate groundwater assessment.

In September 1986, an EPA contractor conducted an inspection and assessment of the Reilly site. The contractor's report identified groundwater monitoring and other activities that were still needed for proper closure evaluation of the site (Jacobs, 1986). There is no indication that Gra-Iron acted on any of the report's recommendations before its bankruptcy in 1987.

The Reilly site is bounded by two railroad right-of-ways and a public road. Access to the site is uncontrolled (Drustrup, 1987).

The department conducted a preliminary assessment of the site in September 1988. The assessment recommended further investigation with a medium priority (Drustrup, 1988a). Later that month, the department collected soil and groundwater samples from the site (Drustrup, 1988b).

WASTES

Gra-Iron cupola baghouse dust and foundry sands, rubble and Marshalltown water treatment lime sludge are the only materials known to be disposed of in the Reilly site (Turkle, 1982a; Cook, 1982a; Jacobs, 1986). The rubble, lime sludge and foundry sands are non-hazardous wastes.

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The cupola baghouse dust is a hazardous waste because it contains high leachable concentrations of cadmium and lead (Shive-Hatterly 1981a & 1981b; Serco, 1982). It is classified as a characteristic hazardous waste; D006 for leachable cadmium and D008 for leachable lead.

Gra-Iron did not record the actual amount of baghouse dust disposed of at the Reilly site (Hickok, 1986a). However, there is enough information available to estimate the amount of baghouse dust disposed of at the site.

Disposal of baghouse dust began in 1980 and ended in 1982. It occurred for about eighteen months (Hickok, 1986a) to two years (Turkle, 1982a; Anderson, 1982). In early documents, Gra-Iron estimated baghouse dust generation rates of from 160 to 170 tons/year (McLean 1981; Shive-Hatterly, 1981b; Squibb, 1981a). In later documents, the company reports much lower generation rates of from 3.5 to 5 tons/month (Vlieger, 1982; Stricker, 1981). Based on this information, the amount of cupola baghouse dust at the Reilly site may be as high as 350 tons or as low as 60 tons.

Gra-Iron generated about 30 times as much foundry sand as baghouse dust (Shive-Hatterly, 1981b). Prior to co-disposal at the Reilly site, the baghouse dust was mixed with foundry sand. Disposal of foundry sand continued at the site until Gra-Iron stopped operating in 1987.

Disposal of wastewater treatment sludge was discontinued in 1982 (Cook, 1982a). Gra-Iron wastes were deposited on top of the lime sludge; burying this material in the central part of the fill area (Hickok, 1986c). There is no estimate of the amount of lime sludge or of the amount of rubble disposed of at the site.

ACTUAL OR POTENTIAL CONTAMINANT LEVELS IN VARIOUS MEDIA

GROUND WATER

Gra-Iron has conducted groundwater monitoring from three monitoring wells at the site. The location of these wells is shown in Figure 5a. This topographic map of the Reilly site also shows the projected gradient of the groundwater table and the approximate location of the lime sludge in the fill area.

The results of the first sampling period showed cadmium and lead pollution levels above the drinking water standard. Lead exceeded the standard at all three wells, while cadmium exceeded the standard at two wells. However, during the next two sampling periods there were no cadmium or lead pollution levels above the drinking water standard.

The department collected groundwater samples from the three monitoring wells in September 1988. These results showed no detected concentrations of cadmium or lead (dissolved metals) in any of

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the wells. The results for wells #2 and #3 are inconclusive because of the higher minimum detection limit used during the analysis (UHL, 1988).

Table 1 shows the monitoring results for the four sampling periods (Hickok, 1986c and UHL, 1988).

Gra-Iron has suggested that the initial, higher pollution levels were caused by contamination from the well drilling process. They have also suggested that the later results show the minimal groundwater threat posed by their waste site (Hickok, 1986c).

The department and EPA have not accepted these suggestions, because of uncertainties about groundwater flow and the proper placement of monitoring wells. These objections included the possibility that the monitoring wells were not downgradient from the waste site (Jacobs, 1986 & Roberts, 1987).

Currently, waste at the site is directly exposed to infiltration from rainfall and runoff. Part of the fill surface contains piles of clay that may have been stockpiled as material for capping the site (Drustrup, 1987).

SOIL SURFACE

A layer of foundry sand may cover most of the baghouse dust disposed of at the site. The results of surficial soil samples indicate that there is no significant risk from direct contact to contaminants at the site (Dustrup, 1988b).

In September 1988, four surface soil samples were collected at depths of 0-6 inches. Three to five aliquots were taken per sample. The sample locations are shown in Figure 5b. The area of sample #1 had considerable black sandy material at the surface which apparently is foundry sand. Asphalt rubble partially covered the area of sample #2. Some foundry sand (?) and yellow clay were encountered in the area of sample #3. Mainly yellow clay was encountered in the area of sample #4 (Drustrup, 1988b). The results of the soil sample analysis are shown in Table 2.

There does not appear to be any baghouse dust on the fill surface. However, it could become exposed by future gully erosion.

SURFACE WATER

There is no apparent continuous or intermittent stream flow through the Reilly site. However, the identification of drain culverts into and out of the site (Figure 1) indicates that surface flow occurs during periods of heavy rainfall or snowmelt.

The results of upgradient/downgradient sediment samples indicate that no significant release of contaminants is occurring due to erosion and runoff from the site (Dustrup, 1988b). The sample locations are shown in Figure 5b and the sample results are shown in Table 2.

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If contaminated materials are eroded from the fill area in the future, there is potential off-site transport of contaminated sediment to Linn Creek and the Iowa River.

HEALTH EFFECTS AND TOXICITY DATA

Both cadmium and lead are of concern at the Reilly site. There is much information about the toxic properties and health effects of these two heavy metal elements. Appendix A contains a summary of this information, presented separately for each element.

POPULATION & LOCATION OF SIGNIFICANT FEATURES

According to the 1980 census, the population of Marshalltown is 26,938. Almost all of this population and all concentrations of the potentially sensitive population (schools, nursing homes, health care centers) are located west of the site. These people should be using drinking water from the public water supply, which does not appear to be potentially threatened by groundwater pollution from the Reilly site.

Approximately 30 people live within one mile to the east of the Reilly site. These people may be using drinking water from private wells, which are potentially threatened by groundwater pollution from the Reilly site.

Figure 2 shows that it is a short walking distance, by public road or railroad right-of-way, from the nearest residential neighbor to the site. Because of uncontrolled access to the site, there is probably some casual use of the site by older children and adults. During this casual use there is the potential for dermal contact with exposed hazardous waste.

Figure 6 shows the position of the Reilly site with respect to the Marshalltown public water supply, the Iowa River valley and the City of Marshalltown.

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TABLE 1

GROUNDWATER MONITORING RESULTS FOR TOTAL CADMIUM & LEAD
(Concentrations in mg/L)

Monitoring Well Number	Cadmium Concentrations			
	12/13/85	1/27/86	3/20/86	9/14/88*
#1	0.030	<0.001	0.003	<0.001
#2	0.030	<0.001	<0.001	<0.020
#3	<0.001	<0.001	<0.001	<0.020

Monitoring Well Number	Lead Concentrations			
	12/13/85	1/27/86	3/20/86	9/14/88*
#1	0.36	<0.01	<0.01	<0.01
#2	0.44	0.03	<0.01	<0.10
#3	0.22	0.03	<0.01	<0.10

*Results for 9/14/88 are for dissolved metals.

TABLE 2

TOTAL CADMIUM AND LEAD IN SOIL AND SEDIMENT SAMPLES
(Concentrations in mg/kg)

Soil Sample Number	Cadmium	Lead
1	<2	110
2	<2	97
3	<2	230
4	<2	76
"Upgradient Sediment"	<2	42
"Downgradient Sediment"	<2	50

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FIGURE 3A: GEOLOGICAL CROSS SECTION (Hickok, 1986a)

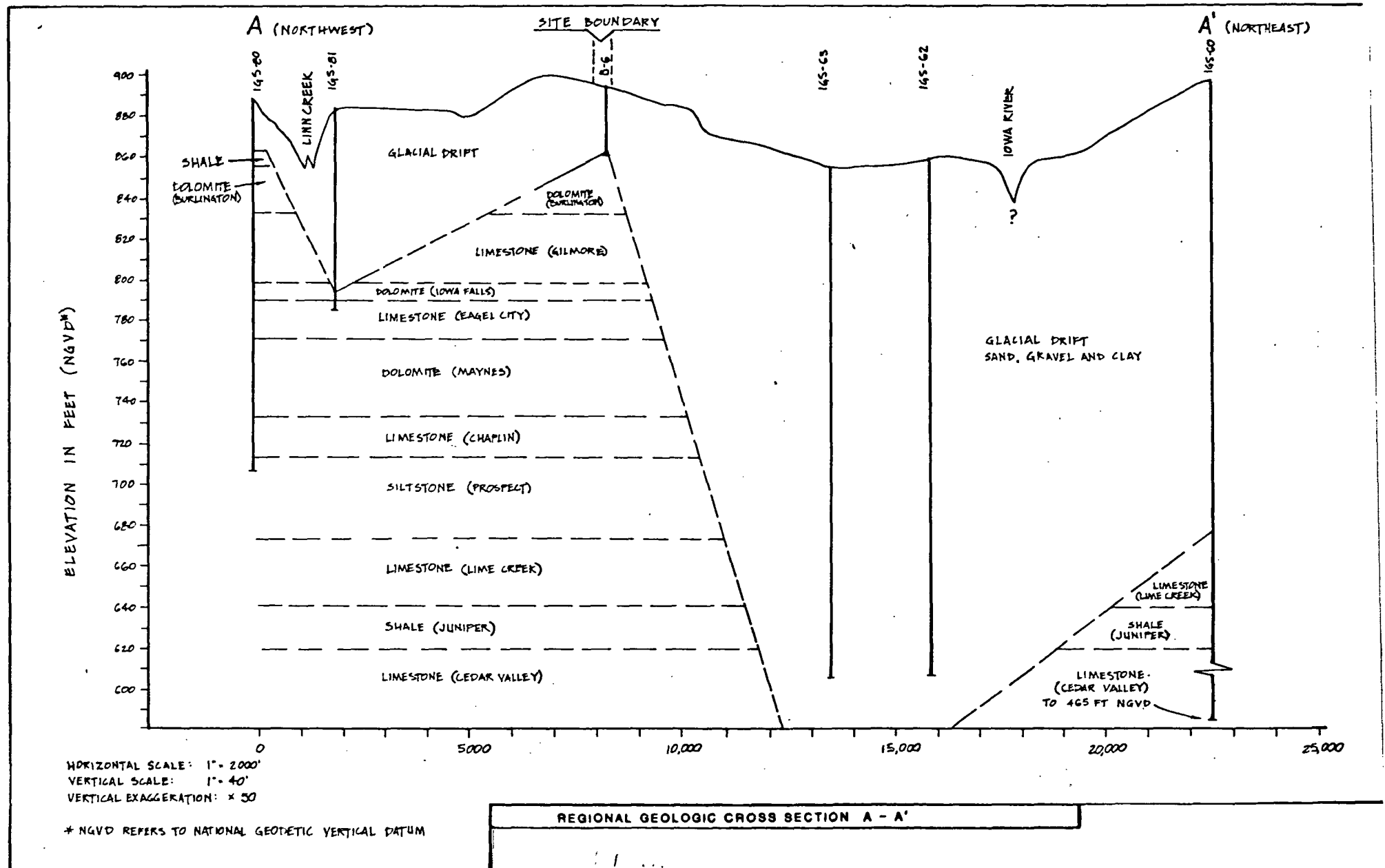
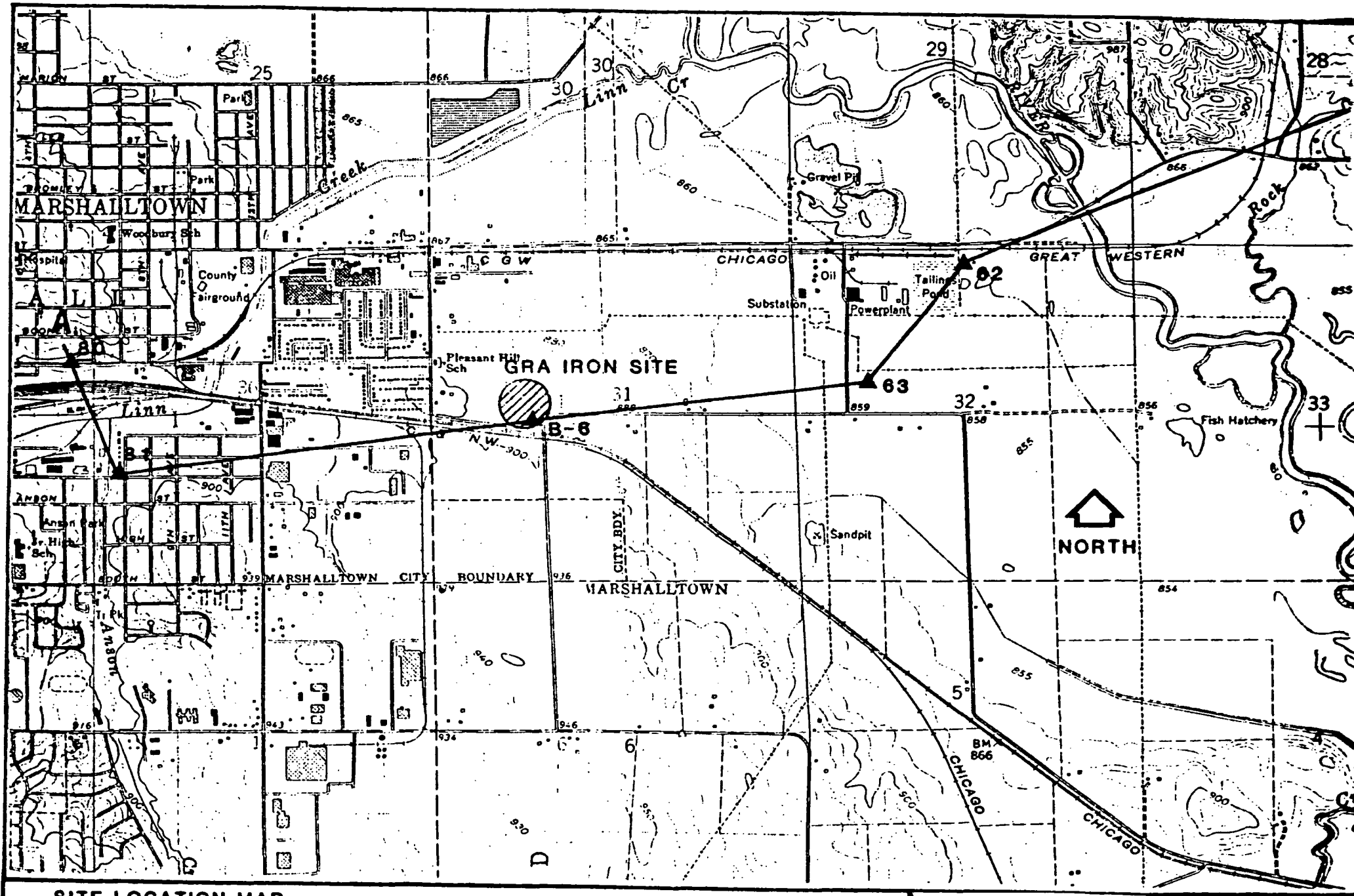


FIGURE 3B: CROSS SECTION REFERENCE MAP (Hickok, 1986a)



SITE LOCATION MAP

FIGURE 4: SURFICIAL AQUIFERS
(Twenter & Cobble, 1965)

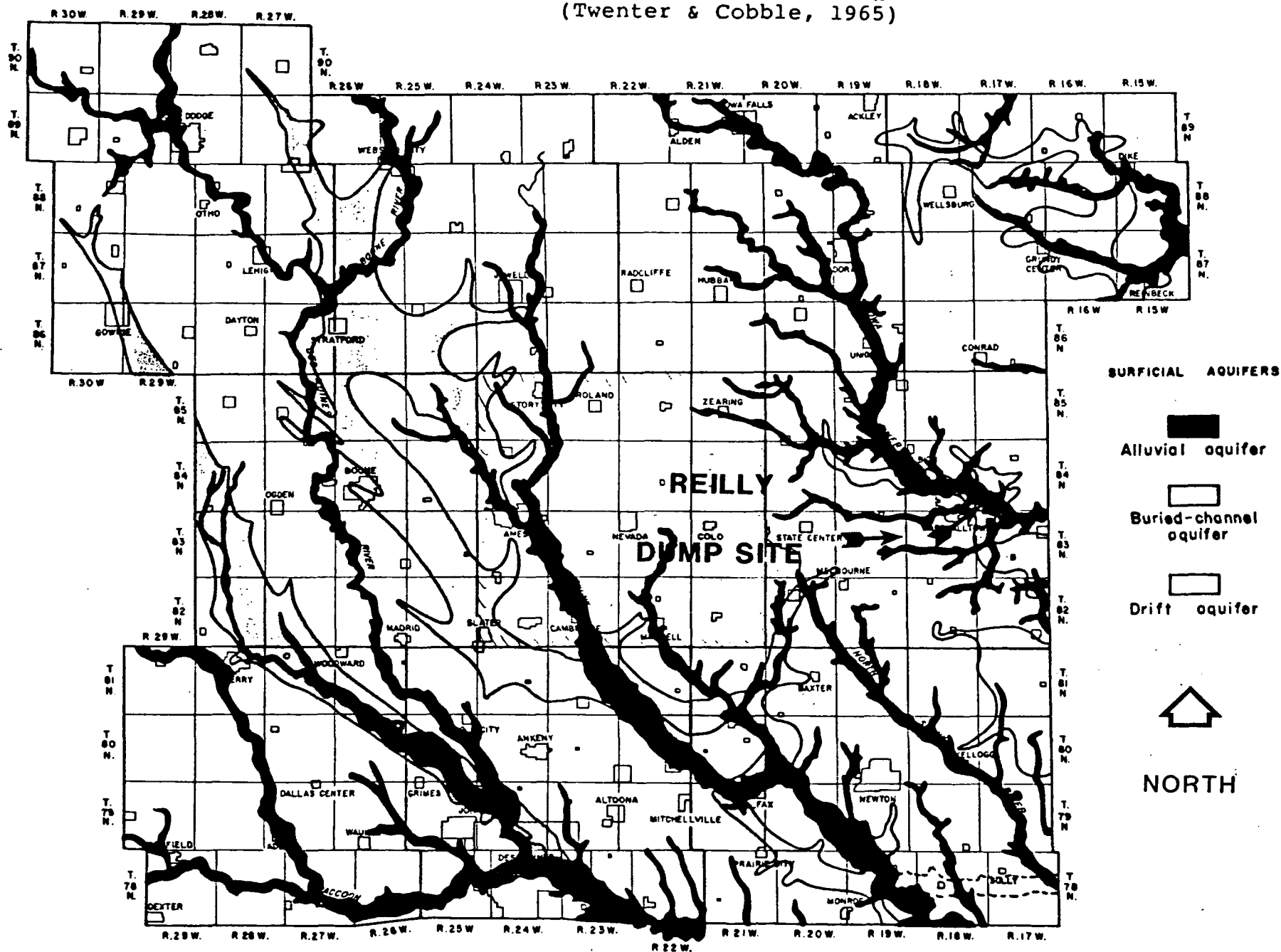


FIGURE 5a: MONITOR WELL LOCATIONS (Hickok, 1986c)

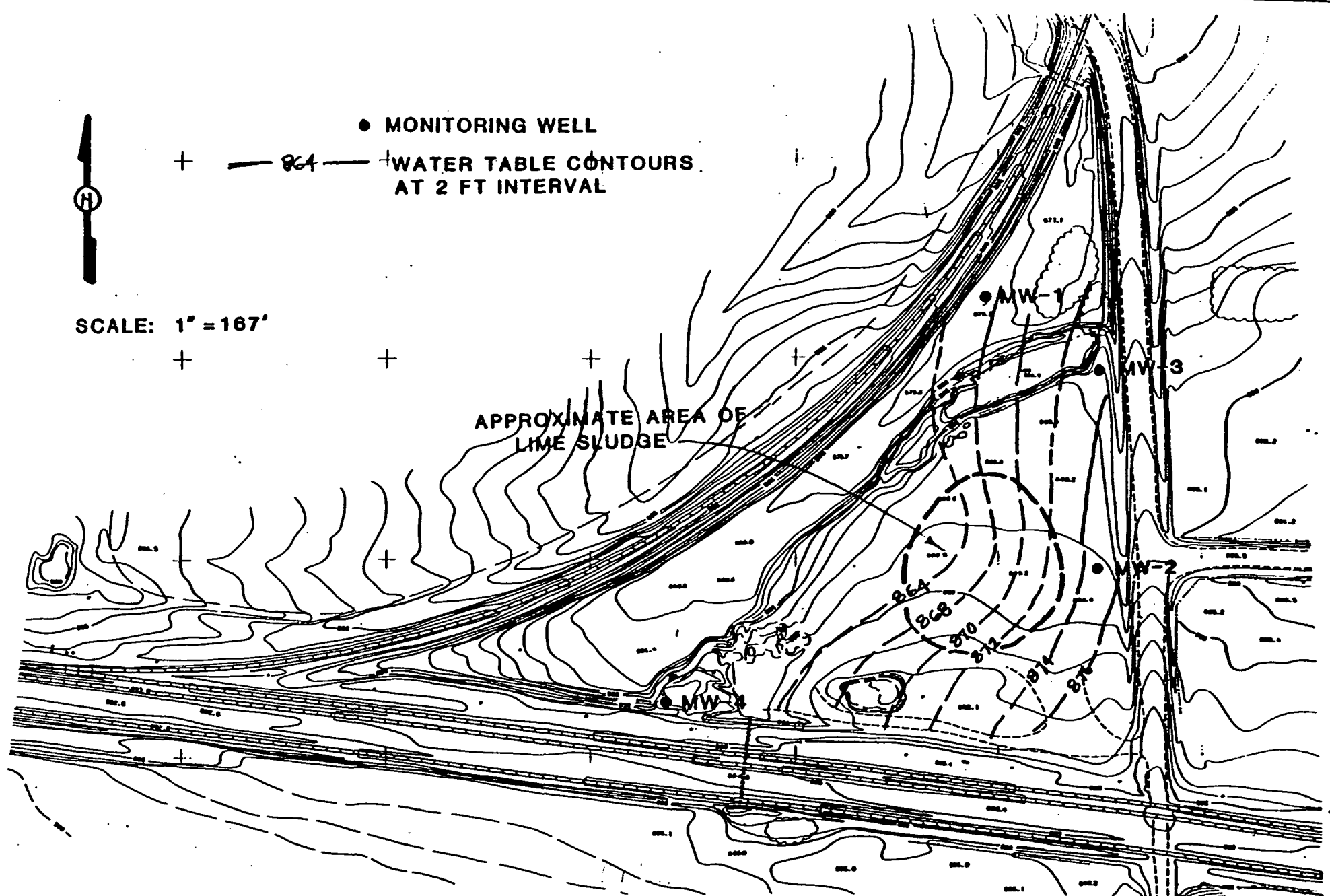


FIGURE 5b: SOIL AND SEDIMENT SAMPLE LOCATIONS (Drustrup, 1988b)

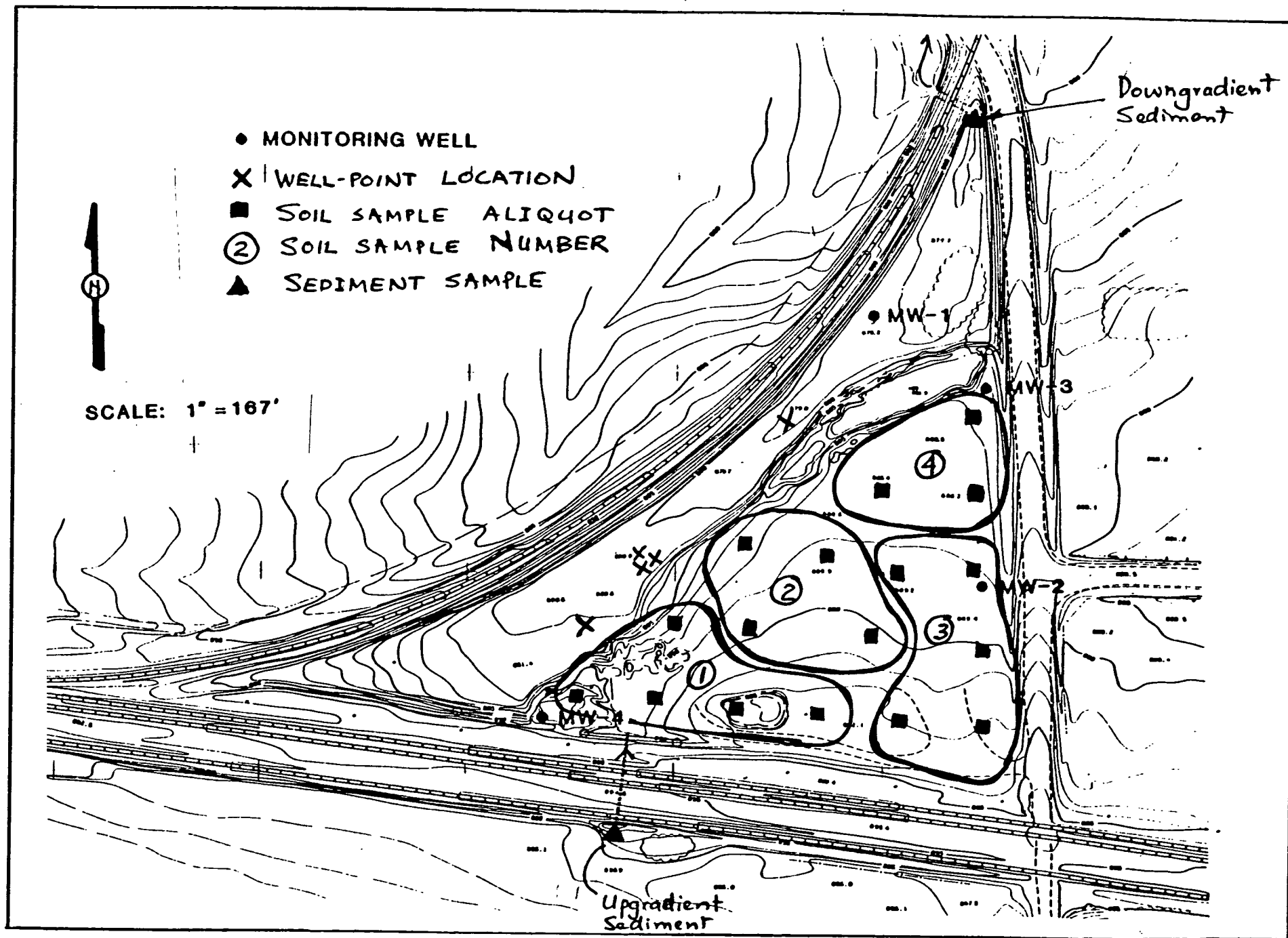
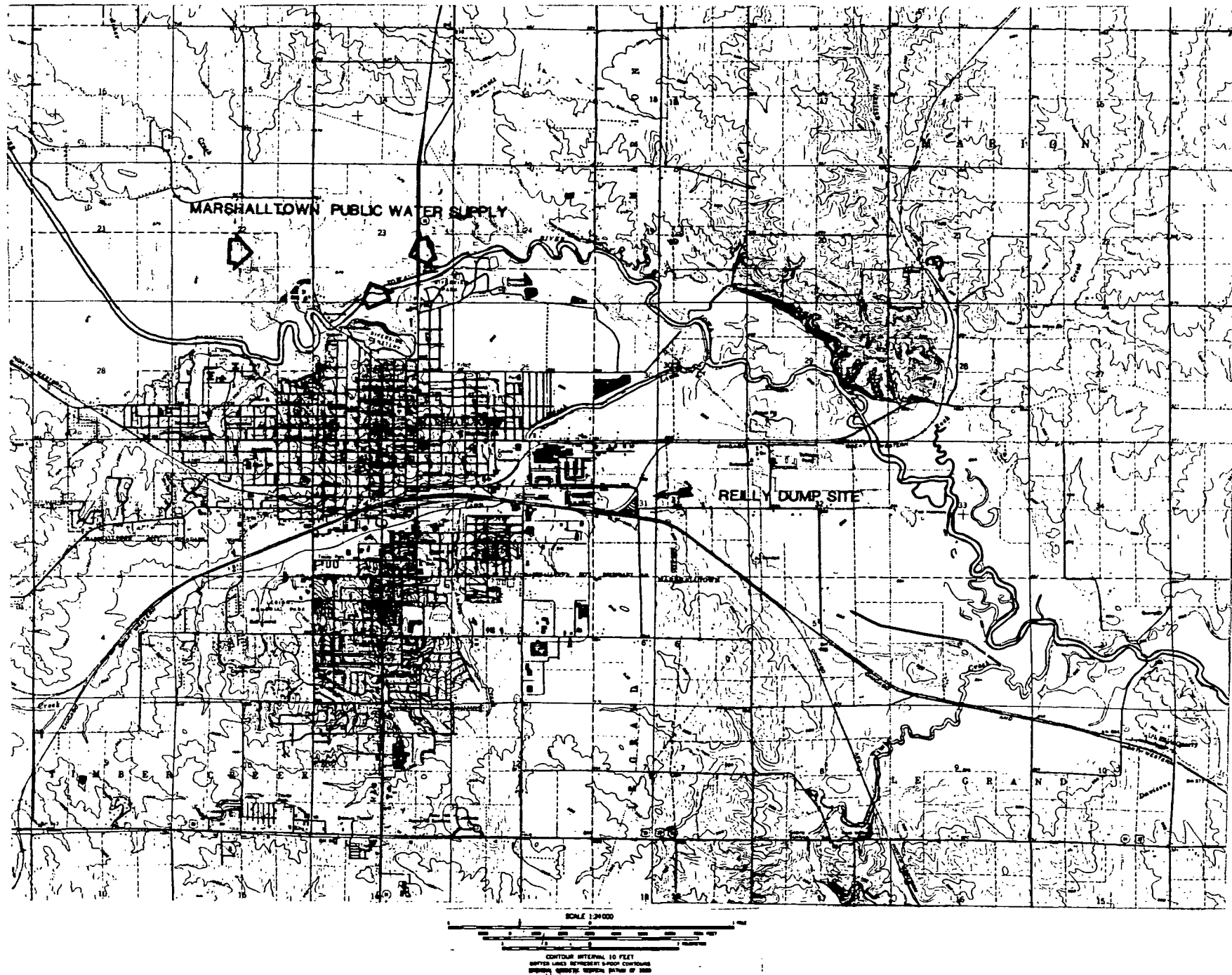


FIGURE 6: TOPOGRAPHIC MAP OF THE MARSHALLTOWN AREA



(Reilly Site)

APPENDIX A
TOXICITY AND ENVIRONMENTAL FATE SUMMARIES

Cadmium

Lead



TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF PUBLIC HEALTH

MARY L. ELLIS, DIRECTOR

M E M O R A N D U M

DATE: May 16, 1989

TO: Morris Preston
Solid Waste/Abandoned Uncontrolled Sites
Iowa Department of Natural Resources

FROM: John A. Eure *JA E*
Assistant to the Division Director
for Environmental Health
Division of Disease Prevention

RE: Reilly Dump Site
State Abandoned or Uncontrolled Site Registry
Site Information Package

The information package pertaining to the above referenced site was reviewed with respect to the site's impact on public health. We concur with your proposed "c" classification provided certain conditions are met to protect the public health. These conditions are:

1. Vertical and horizontal boundaries and the direction of groundwater flow of the surficial aquifer surrounding the site should be determined. Private wells drawing water from potentially contaminated aquifers should be identified and sampled. The groundwater samples should be analyzed for lead and cadmium at detection limits that will be protective of public health.
2. Restrict the use of contaminated groundwater until the site and groundwater have been remediated.
3. No consumable crops (i.e. edible plants) should be grown on site until the site has been remediated.

JEH/dlc

IOWA DEPARTMENT OF NATURAL RESOURCES
Solid Waste/Abandoned Uncontrolled Sites

DATE: May 30, 1989
TO: Mark Landa, Legal Services
FROM: Morris Preston
SUBJECT: Transmittal of the Reilly Dump Site Information Package

An information package is enclosed for the Reilly Dump site which we are proposing for the State Abandoned or Uncontrolled Site Registry (SAUSR). The current owner and property description are identified in the package.

It is our intention to classify the site as a class "c" site. Hazardous wastes containing cadmium and lead have been disposed of on the site. This determination has been reviewed by the Department of Public Health and they are in agreement. A copy of their memorandum is enclosed.

Please notify the site's owner of the department's intention to include the site on the SAUSR.

IOWA DEPARTMENT OF NATURAL RESOURCES
Solid Waste/Abandoned Uncontrolled Sites

DATE: January 27, 1989

TO: John Eure
Iowa Department of Public Health
Lucas Building

FROM: Morris Preston

SUBJECT: Reilly Dump Site
State Abandoned/Uncontrolled Site Registry
Site Information Package

An information package is attached for the Reilly Dump Site which we will be proposing for the State Abandoned or Uncontrolled Site Registry (SAUSR). We are requesting your department's review of the information and intended classification with respect to matters relating to public health.

It is our intent to register the site with a "c" classification in accordance with Code of Iowa Section 455B.427.3. This classification is for sites that do not pose a significant threat to the environment and remedial action can be deferred. This determination is based on the following:

1. From 60 to 350 tons of hazardous cupola baghouse dust were disposed at the site. It was a characteristic hazardous waste; D006 for leachable cadmium and D008 for leachable lead.
2. The hazardous waste was co-disposed with non-hazardous foundry sand. The site surface appears to be covered with foundry sand and a yellow clay material.
3. The site has not been capped or otherwise properly closed. However, exposure to the site surface materials does not pose a significant health threat.
4. There does not appear to be any significant movement of contaminated materials from the site; either by surface erosion or groundwater flow.

We await your comments to allow us to complete the documentation on this site. If you have any questions or require additional information, please contact me at 515/281-4968.

ATTACHMENT

Environmental Protection Division

April 25, 1988

TO OFFICE: The Record

ATTENTION: Morris Preston

REF. NO.: 81160017

FROM: John H. G. Vedder

OFFICE: Air Quality & Solid Waste Protection Bureau

SUBJECT: SAUSR Eligibility Determination: Gra-Iron Foundry Corp,
Marshalltown

Three sites have information in our files about hazardous waste generated by Gra-Iron Foundry. This information supports the following eligibility determinations:

- 1) Reilly Dump Site: Eligible for the SAUSR registry.
- 2) Gra-Iron Plant Site: NOT eligible for the SAUSR registry.
- 3) "Unidentified" dump site by the Iowa River: May be eligible for the SAUSR registry; further information required to make determination.

General Information: The Gra-Iron foundry has been located at its present site at 501 S. 12th Ave, Marshalltown, since 1929. The last major capital expenditure was for air pollution control on the foundry's cupola. This baghouse control device began operation in February, 1976 and was used until the company closed in September, 1987.

The cupola baghouse dust has been identified as a hazardous waste based on EP toxicity for cadmium and lead (EPA HW numbers D006 & D008). The company reported annual waste generation of 170 or 160 tons (about 14 tons/month). Other company documents indicated lower waste generation rates (4 to 6 tons/month).

Prior to entering the baghouse control device, emissions from the cupola were run through a quench tank. The sludge from this quench tank is indicated as a hazardous waste. The annual amount of sludge is not in the record, although it appears minor in comparison to the baghouse dust.

Reilly Dump Site This area was used to dispose of cupola baghouse dust from August 1, 1980 until July/August, 1982. The total amount of cupola baghouse dust disposed of may be as high as 340 tons or as low as 120 tons. This cupola baghouse dust is a hazardous waste for EP toxicity (D006 & D008). Prior to its bankruptcy in 1987, Gra-Iron had been required by EPA to stop using this dump site and to develop and implement a closure plan.

Gra-Iron Plant Site For several years, cupola baghouse dust was stored on plant property, prior to disposal elsewhere. During 1981 and 1982, the baghouse dust was mixed with foundry sand before it was disposed in the Reilly site. The company stopped this practice in 1983 and removed some of the contaminated soil under a HW closure plan. Post closure soil testing indicates the absence of HW at the plant site.

Hearsay evidence indicates that much of the plant site has been used for the disposal of foundry wastes. This should have occurred before the generation of baghouse dust. Therefore, it is assumed that this waste would have been mainly foundry sand.

"Unidentified" dump site by Iowa River Gra-Iron started generating cupola baghouse dust in February, 1976. After August 1, 1980, this waste was sent to the Reilly dump site or a hazardous waste landfill. For previous disposal, there is one document which indicates the use of an unidentified dump site by the Iowa River. There is no estimate of the amount of time this site was used.

The length of unaccounted disposal activity is four and half years. The amount of waste disposed of could be as high as 750 tons (more than twice the amount of baghouse dust that was disposed of at the Reilly site).

The contractor who hauled the baghouse dust to the Reilly site is identified as hauling this waste to the unidentified dump site.