

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99
Revised 9/20/02

RCRA Corrective Action
Environmental Indicator (EI) RCRA Info code (CA725)
Current Human Exposures Under Control

Facility Name: John Deere Des Moines Works
Facility Address: 825 S. W. Irvinedale Drive, Ankeny, Iowa 50021
Facility EPA ID #: IAD069624500

DETERMINATION RESULT: YE

1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?

If yes - check here and continue with #2 below.

If no - re-evaluate existing data, or

if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

John Deere Des Moines Works (JDDMW) is located on approximately 454 acres of land located at 825 S. W. Irvinedale Drive, Ankeny, Iowa (See Figure 1). This property is surrounded by residential, light commercial, light industrial, and agricultural properties (See Figure 2). JDDMW is a diversified farm equipment and machinery manufacturing company that produces primary and secondary tillage, planting, cotton-picking, and cotton stripping equipment.

The facility was initially developed and operated by the Department of Defense (DOD) as a small arms ammunition production facility during World War II. Deere & Company purchased approximately 586 acres of property for the DOD in 1947. The Deere purchase included the main manufacturing buildings, and a landfill and sewage treatment plant south of the buildings.

From October 1950 to October 18, 1993, approximately 160.5 acres of Deere Land were sold to the Chicago Northwestern Railroad, the City of Ankeny, and the state of Iowa in various size parcels, including the 44-acre landfill area and sewage treatment plant that was deeded to the City of Ankeny in 1965. Approximately 28.5 acres were purchased from Iowa State University in Jun 1951. The remaining 454 acres comprise the current JDDMW facility.

A Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA), including a visual site inspection (VSI), was performed by a U.S. Environmental Protection Agency (EPA) contractor at the facility in 1993. Solid Waste Management Units (SWMUs) and areas of concern (AOCs) were identified at the facility as a result of the RFA. The RFA identified forty SWMUs and six AOCs (Metcalf & Eddy 1994). In the Current Conditions Report, five Other Units (OUs) were also identified (Montgomery Watson 1999).

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RCRA RECORDS

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All identified solid or hazardous waste treatment, storage, or disposal units or areas at JDDMW, both past and present, as defined in the Current Conditions Report, are described below. (Montgomery Watson 1999). Figure 3 indicates the location of each SWMU, AOC of other unit.

- SWMU 1, Satellite Accumulation Containers.
- SWMU 2, Key 10 - Less-Than-90-Days Storage Area
- SWMU 3, Key 5- Container Storage Area
- SWMU 4, Key 1 - Horizontal Steel Storage Tank
- SWMU 4, Key 2 - Two horizontal Steel Storage Tanks
- SWMU 6, Key 15 – Vertical Steel Storage Tanks
- SWMU 7, Key 17 – Oil Skimming Underground Storage Tank
- SWMU 8, Six Dust Collectors
- SWMU 9, Dust Collector
- SWMU 10, Tube Cell-Metal Shaving Hopper
- SWMU 11, Machining Metal Parts Storage
- SWMU 12, Wastewater Pretreatment Plant and Sludge Loading Area
- SWMU 13, Empty Drum Storage Area
- SWMU 14, Landfarm for contaminated soil
- SWMU 15, Drummed Waste Pickup Areas (Nos. 16A, 16B, 16C, 16D)
- SWMU 16, Temporary Drum Storage Area
- SWMU 17, PCB Storage Area
- SWMU 18, Waste Cutting Oil Tank (ID No. 57)
- SWMU 19, Waste Oil Tanks 5, 6, 7, and 8
- SWMU 20, Waste Cutting Oil and Solvent Tank
- SWMU 21, Concrete Underground Storage Tank (Tank 58)
- SWMU 22, Cyanide Salt Pot Disposal Areas (Initial and Relocated)
- SWMU 23, Key 3 – Abandoned Caustic Sludge Pit
- SWMU 24, Key 6 – Abandoned Wastewater Sludge Pit
- SWMU 25, Stormwater Runoff Ditch and Catch Basin (East side of Property)
- SWMU 26, Three Scrap Metal Storage Areas
- SWMU 27, Scrape Aluminum Storage Area
- SWMU 28, Former Sandblast Area
- SWMU 29, Black Beauty Shot Blast Area
- SWMU 30, Drummed Waste Oil/Solvent Storage Areas
- SWMU 31, Battery Recycling Accumulation Area
- SWMU 32, Surplus Transformer Storage Area South of Building 10
- SWMU 33, Trash/Cardboard Compactor
- SWMU 34, Department 19 Chrome Destruct Tank
- SWMU 35, Waste paint and Waste Caustic Stripping Solution Releases
- SWMU 36, Quench Scale and Metal Turnings Pile
- SWMU 37, Ram Exhaust Oil Demister
- SWMU 38, Process Wastewater Conveyance System
- SWMU 39, Vapor Degreaser
- SWMU 40, Paint Overflow Underground Storage Tanks
- AOC A, Removed Product Tanks without documentation of removal (Tanks 1, 2, 4, 9, 17, 18, 34, 38, 50, 56, 74)
- AOC B, Removed Product Tanks with documentation of Removal (Tanks 12, 13, 22, 23, 24, 25, 28, 56, 64, 76, 80)
- AOC C, Chromium release investigation near Building 2-G
- AOC D, Former Underground D-100 Solvent Storage Tanks (ID No. 26 and old Tank 26)
- AOC E, Former Underground Storage Tanks 14, 15, and 16
- AOC F, Former Underground Storage Tanks 10 and 11
- Other Unit i, DOD Chrome Plater

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Other Unit 1, Former Railroad Locomotive Shop
Other Unit 2, Chrome Plating System in Building 2G
Other Unit 3, Zinc Plating System in Building 2G
Other Unit 4, Chrome Plater Solution Spill

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in the RCRA Info national database ONLY as long as they remain true (i.e., RCRA Info status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be “contaminated”¹ above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act] from releases subject to RCRA Corrective Action (from SWMUs, RUs, or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			See below for explanation
Air (indoors) ²		X		
Surface Soil (e.g., <2 ft)	X			See below for explanation
Surface Water		X		
Sediment	X			See below for explanation
Subsurf. Soil (e.g., >2 ft)	X			See below for explanation
Air (outdoors)		X		

_____ If no (for all media) - skip to #6, and enter “YE,” status code after providing or citing appropriate “levels,” and referencing sufficient supporting documentation demonstrating that these “levels” are not exceeded.

Y If yes (for any media) - continue after identifying key contaminants in each “contaminated” medium, citing appropriate “levels” (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter “IN” status code.

Rationale and Reference(s):

JDDMW is located in the western portion of the City of Ankeny, Iowa in Section 22, Township 80 North, Range 24 West, Polk County, Iowa. The facility, which is a diversified farm equipment manufacturing company since 1947, is located 454-acre parcel of land at 825 S.W. Irvinedale Drive, Ankeny, Iowa. The JDDMW grounds and

¹ “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

²Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggests that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

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surrounding area exhibit relatively flat topography and is positioned on the glaciated Des Moines Lobe in central Iowa. Flat topography and developing drainage systems are typical of landscapes on the Des Moines Lobe. Surface drainage is better developed west of the facility than to the east. A tributary of Saylor Creek is the only waterway that traverses the JDDMW property. The Saylor Creek flows through Margo Frankel Woods State Park before joining the Des Moines River approximately eight miles south of the facility. Eleven water wells (production, municipal, residential) within one-mile radius of the facility are shown in Figure 4 (Montgomery Watson 1999)

Groundwater

Site-Specific data obtained during drilling activities at JDDMW indicated depths to groundwater ranging from approximately 6 to 10 feet below grade and variable groundwater infiltration rates. Groundwater was released more readily where sand and gravel lenses were encountered within the till. The occurrence of groundwater varies with seasonal and climatic conditions.

Groundwater has been impacted by contaminants at the site. Figure 5 shows the locations of the on-site monitoring wells at the facility (Montgomery Watson 1999). Contaminated groundwater samples have been collected from the wells in AOC C and D. Attachment A contains the results of sampling activities at SWMUs, AOC, and other units (Montgomery Watson 1999). Table 1 shows where maximum concentrations of contaminants were detected.

TABLE 1
COMPOUNDS DETECTED IN GROUNDWATER EXCEEDING
THEIR RESPECTIVE MAXIMUM CONTAMINANT LEVELS (MCL) AND PRELIMINARY
REMEDIATION GOALS (PRG)

Contaminants	Well Number where maximum concentration was detected	Maximum Detected Concentrations (µg/L)	MCL or PRG (µg/L)
Benzene	AOC D MW-6	26	5.0 *
Ethylbenzene	AOC D MW-6	1,000	700 *
Hexavalent Chromium	AOC C MW-2-3	150,000	110 **

Notes: µg/L Micrograms per liter

* Maximum Contaminant Level (EPA 2002a)

** Region 9 Preliminary Remediation Goals (PRGs) for tap water (EPA 2004)

Indoor Air

Some organic vapors may be entering on-site buildings by volatilizing from groundwater or soil. However, releases may be considered of secondary importance to air concentrations resulting from the operations of the facility. Because the constituents from these two sources are expected to be similar, identification of the actual source of any detected contaminants would be difficult. No indoor air sampling has been conducted at the JDDMW facility. EPA guidance can be used to determine if indoor contamination is likely at the facility, and the Johnson-Ettinger model can be used to estimate indoor air concentrations at locations that meet the screening criteria (EPA 2002b).

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Outdoor Air

VOC constituents are in both soil and groundwater at JDDMW. Either medium can generate VOCs in soil gas vapors that can migrate up through the ground surface to outdoor air. However, vapors from contaminated soil will not accumulate in outdoor air in the absence of a confining structure, so outdoor air at the JDDMW facility is not a consideration.

Soil (Surface and Subsurface)

JDDMW is located in an area covered by the Wisconsin-age glacial till. According to data obtained from several shallow soil borings drilled at the facility, silty clays interbedded with some gravel and sand are typically encountered to a depth of 20 feet. (Montgomery Watson 1999)

Soil has also been impacted by contaminants at the JDDMW facility. Previous investigations at the facility have indicated contaminant releases to the soil in the areas around SWMUs 2, 3, 7, 22, 23, 24, 25, 32, 35b, 38, 40, AOC B (12, 22, 23, 24, 25), AOC C, AOC D, AOC E, AOC F, Other Unit 2 and 4 (as defined in Table 2 of the 1999 Current Conditions Report). Several constituents of concern have been detected in these areas, including VOCs, metals, and polycyclic aromatic hydrocarbons (PAH). Attachment A contains the results of sampling activities at SWMUs, AOCs, and other units (Montgomery Watson 1999). Table 2 shows the maximum concentration of a range of constituents in soil and other media.

TABLE 2
CONSTITUENTS DETECTED IN SOIL AND OTHER MEDIA

Contaminants	Area where maximum concentration was detected	Maximum Detected Concentrations (mg/kg)	Region 9 PRG Industrial (EPA 2004) (mg/kg)
Benzo(a)anthracene (PAH)	SWMU 23	4	2.1
Benzo(b)fluoranthene (PAH)	SWMU 23	17	2.1
Benzo(k)fluoranthene	SWMU 23	11	2.1
Lead	SWMU 23	8,000	800
chromium (total)	AOC C	1,400	450
TEH as D-100 solvent	AOC D	6,900	NA

Notes: mg/kg milligrams per kilogram

Surface Water and Sediment

Records indicate that surface water and sediment sampling was conducted at SWMU 25, stormwater runoff ditch and catch basin. The stormwater runoff ditch is located on the east side of the property. A catch basin (part of the ditch) is located near the southeast corner of the facility. Periodic releases of oil and grease were made to the ditch and were captured in the catch basin. Sediment samples collected from the catch basin showed elevated concentrations of several PAHs (Appendix A). These values were compared to the EPA Region 9 Preliminary Remediation Goals (PRG) values for industrial exposures and were found above the PRGs. No PAHs were detected in the surface water sample collected.

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3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table Potential Human Receptors (Under Current Conditions)							
“Contaminated” Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	No	No	No	Yes	No	No	No
Air (indoors)	_____	_____	_____	_____	_____	_____	_____
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	No	No	No
Surface Water	_____	_____	_____	_____	_____	_____	_____
Sediment	_____	Yes	_____	Yes	_____	_____	_____
Soil (subsurface e.g., >2 ft)	No	Yes	No	Yes	No	No	No
Air (outdoors)	_____	_____	_____	_____	_____	_____	_____

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated”) as identified in #2 above.
2. enter “yes” or “no” for potential “completeness” under each “Contaminated” Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces (“_____”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- _____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter “YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- X If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- _____ If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code

³Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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Rationale and Reference(s):

No risks are currently associated with surface water contaminants, indoor or outdoor air contaminants, as previously described. Sediment samples showed elevated concentrations when compared to screening levels. However, since PAHs were not detected in the surface water sample, the likelihood of facility workers being exposed to sediment samples is limited.

Complete pathways for exposure to trespassers are unlikely because security is maintained 24 hours a day, 365 days a year by posted security guards, surveillance cameras are throughout the facility, and there is a perimeter chain link fence, all which prohibit trespassing on the facility. Because of the industrial setting of the facility, both residential, daycare, recreation and food receptors can be excluded.

Drinking water to local residences and commercial businesses immediately surrounding the facility is supplied by the City of Ankeny, Iowa. The City of Ankeny receives all of its water from the Des Moines Water Works. The sources of the Des Moines Water Works water supply are the Des Moines and Raccoon Rivers. The nearest intake is located approximately 6.25 miles south of the facility (MWH 2002). Facility workers likely will not be exposed to contaminated groundwater, since no water wells are located at the facility (Montgomery Watson 1999).

Potential risk exists for facility workers associated with contaminated soils. Potential risk also exists for construction workers associated with contaminated groundwater, soils, and sediments at the facility. The facility has procedures in place that before field activities (i.e., excavation) takes place at the site, the facility's Material Engineering Department is contacted, so that information is made available to protect workers (facility and construction) from contaminated media (John Deere 1992a, Montgomery 1993). In addition all personnel working in hazardous waste are given 24-hour HAZWOPER and RCRA training (John Deere 1992b). As a result, as long as the facility remains under current ownership, potential exposures to workers will be drastically limited.

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4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be “significant”⁴ (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

Exposures can be considered significant if the duration or intensity of exposure to contaminated materials exceeds calculated screening levels or if the level of contamination substantially exceeds screening levels. The only completed exposure pathways at the JDDWM is workers (facility and construction) to soils and sediment, and groundwater for construction workers. A site safety plan has been prepared for construction workers who are designated for RCRA Facility Investigation (RFI) field activities (MWH 2002). Also, because of the facility’s field activities notification procedures, exposures from these pathways to workers are not expected to be significant, and drastically limited.

⁴If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

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5. Can the "significant" exposures (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

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6. Check the appropriate RCRA Info status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the John Deere Des Moines Works facility, EPA ID # IAD069624500, located at 825 S.W. Urvinedale Drive, Ankeny, Iowa, under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

NO - "Current Human Exposures" are NOT "Under Control."

IN - More information is needed to make a determination.

Completed by Patricia Murrow Date 9/30/05
(signature)
Patricia Murrow
Project Manager, RCRA Corrective Action & Permits Branch
EPA Region 7

Supervisor Don Toensing Date 9/30/05
Don Toensing
Branch Chief, RCRA Corrective Action & Permits Branch
EPA Region 7

Locations where References may be found:

EPA Region 7
RCRA Records Center
901 North 5th Street
Kansas City, Kansas 66101

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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

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REFERENCES

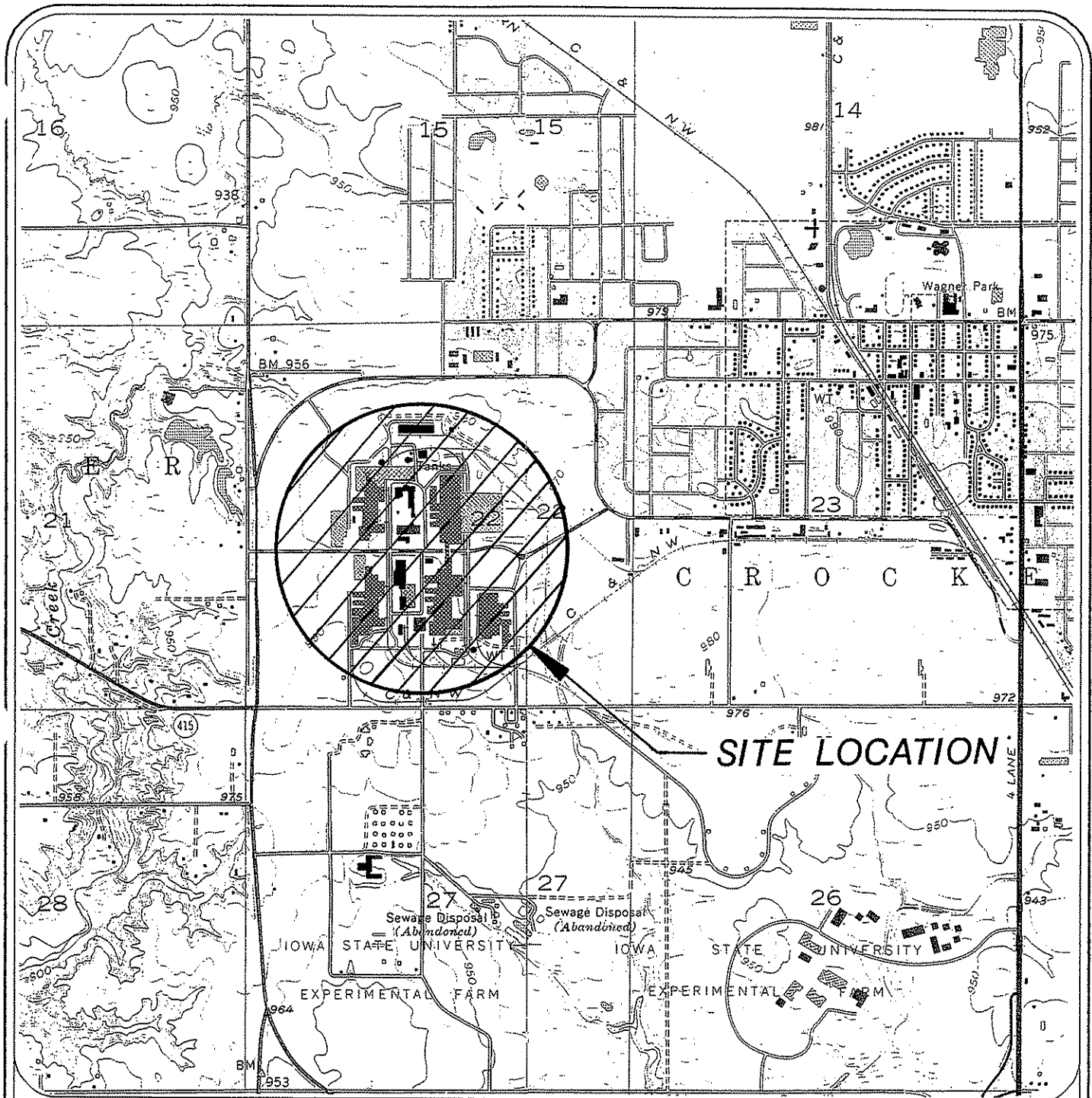
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FIGURE 1

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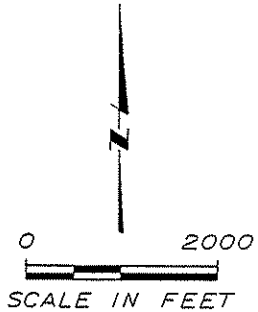
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MAP SOURCE: - U.S.G.S. TOPOGRAPHIC QUADRANGLES,
 DES MOINES NW AND DES MOINES NE,
 POLK COUNTY, IOWA

SITE LOCATON: - SECTION 22, T. 80N., R. 24W.



JOHN DEERE DES MOINES WORKS
 ANKENY, IOWA
SITE LOCATION MAP

FIGURE 1

