DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
in accordance with EPA Interim Final Guidance 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRA Info Code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: River Cement Company
Facility Address: 1000 River Cement Road, Festus, MO 63028
Facility EPA ID #: MOD050232560

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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?

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

   _____ If no - re-evaluate existing data, or

   _____ if data are not available, skip to #8 and enter "IN" (more information needed) status code.

The River Cement Company (RCC) facility is located on about 1,000 acres in Festus, Missouri, 804 acres owned by the facility and 165 acres of leased property on the southeastern corner of the property (see Figure 1) (RCC 1996; Missouri Department of Natural Resources [MDNR] 2003). The facility was constructed in 1965 by the Mississippi River Corporation, then sold in 1978 to UNICEM, IFI International, and Rugby Cement (Metcalf & Eddy [M&E] 1991). In early 2004, a merger formed a new company named Buzzi Unicem USA Inc., which is the current owner (RCC 2004a).

RCC produces Portland cement and clinker in rotary kilns (RCC 1996). The facility also operated as an interim status hazardous waste treatment, storage, and disposal facility. Until 1997, the facility used hazardous waste fuels from off-site generators as supplemental fuel in its cement kilns (MDNR 2003). RCC also stored hazardous waste on site in tanks and drums in preparation for burning (M&E 1991). RCC continues to discharge stormwater draining the property to the Mississippi River under a National Pollutant Discharge Elimination System (NPDES) permit (RCC 2003). The facility now generates less than 100 kilograms of hazardous waste per month (U.S. Environmental Protection Agency [EPA] 2005).

The RCC facility has been monitored and investigated since at least 1981, when the facility filed a notification of hazardous waste activity (M&E 1991). EPA conducted a Resource Conservation and Recovery Act (RCRA) facility assessment (RFA) in 1991 (M&E 1991). Use of hazardous waste as kiln fuel ended in May 1997, and all areas used for the processing and storage of hazardous waste fuel were closed in accordance with a 1998 closure plan; the clean closure was approved by MDNR in December 1998 (MDNR 2003). The facility is currently conducting expedited corrective action, as described in a 2003 letter of agreement (LOA) between RCC and MDNR (MDNR 2003). The LOA required that the facility complete a RCRA facility investigation (RFI), conduct a corrective measures study (CMS), and enact any necessary interim measures. The first draft of the RFI was submitted by RCC to MDNR in July 2005.

The LOA also re-classified the solid waste management units (SWMU) at the facility, drawing from the RFA and a 1996 Part B permit application (MDNR 2003). A list of SWMUs at the facility is provided below and SWMU locations are shown on Figure 2. The primary contaminants released to soil are petroleum hydrocarbons (RCC 2005). Concentrations of contaminants were below MDNR target concentrations for total petroleum hydrocarbons (TPH) in groundwater, sediment, and surface water (RCC 2005). Certain metals were also detected in soil and sediment, but at concentrations within the range of natural occurrence for the facility (RCC 2005).

SWMU 1 – Old Landfill Area. SWMU 1 is a 400-foot by 3,000-foot by 25- to 50-foot-deep landfill, which operated from 1965 until 1982 (RCC 1996; MDNR 2003). The landfill received cement kiln dust (CKD), sanitary waste, brick, crushed rock, clay, and similar industrial waste (RCC 1996). An anonymous caller to MDNR also reported that hundreds of drums containing transformer and lubricating oils were deposited at SWMU 1 between 1965 and 1980 (MDNR 2003). The SWMU now is covered with overburden, unused rock, and CKD, and supports a vegetative cover (MDNR 2003; RCC 2003). The LOA required further corrective action at this SWMU (MDNR 2003).

SWMU 2 – Industrial Landfill. SWMU 2 is a 1,200-foot by 300-foot by 25-foot-deep landfill, which operated from 1982 until at least 2003 (MDNR 2003). Initially, the landfill received industrial and sanitary waste. It now receives only industrial waste generated from mining and cement production, and from general maintenance that includes cleaning up spills of raw materials (RCC 1996). The LOA required further corrective action at this SWMU (MDNR 2003).

SWMU 3 – Kiln Dust Landfill. SWMU 3 is a 1,300-foot by 700-foot by 25- to 100-foot-deep landfill, which operated from 1982 until at least 2003 (RCC 1996; MDNR 2003). The landfill received palletized CKD and is an active CKD management area (RCC 2003). The LOA required further corrective action at this SWMU (MDNR 2003).

SWMU 4 – Original Hazardous Waste Facility (Tank #2558). SWMU 4 is a 15,220-gallon aboveground storage tank (AST), which operated from April to June 1983 (RCC 1996). Hazardous waste fuels were stored in this tank until directed to the kilns (RCC 1996). Two releases were documented at this SWMU: (1) in May 1983, overfilling resulted in a release (volume unknown), and (2) in September 1983, 1 gallon was released from the recirculating pump seal during closure (RCC 1996). MDNR did not accept the clean closure certification submitted by RCC in 1998, requiring further corrective action in the LOA (MDNR 2003). However, soil samples collected in 2004 found no semivolatile organic compound (SVOC) contamination in surface or subsurface soil. Consequently, MDNR agreed that no further investigation was required (RCC 2004b).

SWMU 5 – Waste Oil Storage Area. SWMU 5 is a 6- by 30-foot area in the machine shop that operated from 1965 until at least 2003 (MDNR 2003). The area was used to store drums of lubricant oils, gear oils, cutting oils, and nonchlorinated solvents (MDNR 2003). The LOA did not require further corrective action at this SWMU (MDNR 2003).

SWMU 6 – Lube House. SWMU 6 is a 17- by 30-foot storage area that operated from 1977 until at least 2003 (MDNR 2003). The area was used to store drums of used oil, lubricant oils, gear oils, cutting oils and nonchlorinated hydrocarbon solvents (RCC 1996). The LOA did not require further corrective action at this SWMU (MDNR 2003).

SWMU 7 – Waste Oil Tank. SWMU 7 is a 500-gallon steel containment tank used to accumulate used waste oil generated by routine vehicle maintenance at RCC (MDNR 2003). The waste oil ultimately was burned in the kilns (M&E 1991). The tank was located on a concrete paved parking area (M&E 1991). The LOA required further corrective action at this SWMU (MDNR 2003).

SWMU 8 – Gasoline Tank. SMWU 8 is a 1,000-gallon AST that operated from 1978 until at least 2003 (MDNR 2003). The AST was used to store unleaded gasoline and was located in a bermed, but unpaved, area (MDNR 2003). The LOA did not require further corrective action at this SWMU (MDNR 2003).

SWMU 9 – Fuel Oil (Bunker C) Storage Tank. SWMU 9 is a 1,750,000-gallon AST used to store Bunker C oil; the tank is located in a bermed, but unpaved, area (RCC 1996). The AST was used from 1965 until 1978, although the tank still contained an unknown amount of fuel oil in 1996 (RCC 1996). The LOA required further corrective action at this SWMU (MDNR 2003).

SWMU 10 – Quarry Diesel Tank. SWMU 10 is an 8,000-gallon AST used to store diesel fuel, and is located in a bermed, but unpaved, area (RCC 1996; MDNR 2003). The AST was used from 1972 until at least 2003 (MDNR 2003). Staining was observed on soils beneath piping connections and hoses, and the LOA required further corrective action at this SWMU (MDNR 2003).

SWMU 11 – Diesel Fuel Storage Tank. SWMU 11 is a 15,000-gallon AST used to store diesel fuel, and is located in a bermed, but unpaved, area (RCC 1996; MDNR 2003). The AST was used from 1978 until at least 2003 (MDNR 2003). Staining was observed on soils beneath piping connections and hoses, and the LOA required further corrective action at this SWMU (MDNR 2003).

SWMUs 12 and 13 – Number 1 and Number 2 Diesel Fuel Tanks. SWMUs 12 and 13 are each 300-gallon ASTs used to store diesel fuel. Both are located in a bermed, but unpaved, area (RCC 1996; MDNR 2003). The ASTs were used from 1980 until 1991, but both are still in place (RCC 1996). The LOA did not require further corrective action at this SWMU (MDNR 2003).

SWMU 14 – South Quarry Diesel Tanks. SWMU 14 consists of two 550-gallon ASTs originally used to store diesel fuel and later used to store used oil (RCC 1996). The ASTs previously were located on the south quarry haul road, then relocated north of the facility (MDNR 2003). The ASTs were used from 1980 until 1989 for diesel, then re-located and used until at least 1996 for used oil (RCC 1996). As of 2003, the ASTs were unused (MDNR 2003). The LOA did not require further corrective action at this SWMU (MDNR 2003).

SWMU 15 – Fire Pump Fuel Tank. SWMU 15 is a 140-gallon AST used to store diesel fuel, and is located "within 5 feet of secondary containment with concrete flooring and walls" (RCC 1996; MDNR 2003). Based on the description in the LOA, it is unclear if the tank was inside or outside the secondary containment. The AST was used from 1965 until at least 2003 (MDNR 2003). The LOA did not require further corrective action at this SWMU (MDNR 2003).

SWMU 16 – Bullgear Grease Mixer. SWMU 16 was an electrically rotated cylindrical mixing chamber that used toluene to liquefy hardened grease from cement plant machinery. The liquefied product then was blended with other waste for use in the kiln (RCC 1996). The mixer was operated from 1991 at the latest until at least 1996, and it was removed and destroyed by 2003 (MDNR 2003). The SWMU had one

documented release of about 20 to 30 gallons of mixed grease and toluene to the secondary containment; some may have splashed out of containment (MDNR 2003). The LOA required further corrective action at this SWMU (MDNR 2003).

SWMU 17 and 17b – Used Grease and Oil Drums. SWMU 17 was a storage area used to store drums of grease from sources at the facility, and was located in an unpaved, unbermed area (MDNR 2003). The area was used from 1977 until at least 2003 (MDNR 2003). The LOA required further corrective action at this SWMU (MDNR 2003). After the LOA, an additional oil drum storage area (SWMU 17b) was identified within the containment area for the Fuel Oil (Bunker C) Storage Tank (SWMU 9) (RCC 2005). SWMU 17b also was investigated during the RFI (RCC 2005).

SWMU 18 – Wastewater Treatment System. SWMU 18 is a 17,000-gallon steel AST used to process sanitary wastes from the plant and offices; the tank is located in a bermed, but unpaved, area (RCC 1996; MDNR 2003). The AST was used from 1992 until at least 2003 (MDNR 2003). It discharged to a NPDES-permitted outfall to Cliffdale Hollow Creek (RCC 1996). The LOA did not require further corrective action at this SWMU (MDNR 2003).

SWMU 19 – Old Oil Pump House. SWMU 19 is a covered pump house for large pumps that were used to pump oil from a 300,000-gallon storage tank to the kilns (M&E 1991). The use of the pumps was discontinued in the mid-1970s (M&E 1991). The building also was used as a work area and to accumulate (for less than 90 days) samples from shipments of waste fuels (M&E 1991). During a 1999 site visit, a sump in the floor of the building contained 2 inches of oil (MDNR 2003). The LOA required further corrective action at this SWMU (MDNR 2003).

SWMU 20 – Recirculating Parts Washer. SWMU 20 consists of three parts washers, housed in a maintenance building, that use petroleum naphtha to clean small components (M&E 1991). The parts washers appear to have been used until at least 2003 (MDNR 2003). The LOA did not require further corrective action at this SWMU (MDNR 2003).

SWMU 21 – Rainwater Disposal Areas. SWMU 21 is an area in which potentially contaminated rainwater may have been disposed of on haul roads and coal/coke piles (MDNR 2003). The LOA does not identify the source of the contaminated rainwater; it may be from a secondary containment area. However, the LOA did not require further corrective action at this SWMU (MDNR 2003).

Closed Hazardous Waste Processing Area. The closed hazardous waste processing area was used for acceptance, storage, processing, and burning of hazardous waste fuel (HWF) until its closure in 1998 (Barr Engineering Company [Barr] 1998). HWF included chlorinated solvents (such as trichloroethene), alcohols, ketones, aldehydes, hydrocarbons, acetates, phenol, and aromatic compounds (such as benzene) (M&E 1991). HWF was brought in by rail car and tanker truck, stored in one of six tanks, then piped from tanks to kilns (Barr 1998). During the closure, HWF was removed, units were decontaminated and destroyed or demonstrated to meet clean closure criteria, and soils were sampled (Barr 1998). Samples were analyzed for volatile organic compounds (VOC), SVOCs, and metals, but no constituent exceeded clean closure standards (Barr 1998). The clean closure was approved by MDNR in December 1998 (MDNR 2003).

BACKGROUND

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 "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "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 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).

2. Is groundwater known or reasonably suspected to be "contaminated"[1] above appropriately protective "levels" (i.e., 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, anywhere at, or from, the facility?

_____ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

__X__ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The RCC facility is located on about 1,000 acres in Festus, Missouri, 804 acres owned by the facility and 165 acres of leased property on the southeastern corner of the property (see Figure 1) (RCC 1996; MDNR 2003). The area owned by RCC has been zoned heavy industrial, and the leased property is zoned for agricultural/residential use (MDNR 2003). The surrounding land primarily is heavily wooded agricultural land, with scattered residences to the north, west, and south (M&E 1991). It is bordered by the Mississippi River to the east (M&E 1991). The facility itself is covered by a mix of buildings, asphalt, gravel, and vegetation, with active limestone quarries on the northern portion of the facility and on the leased land (see Figure 1) (M&E 1991).

The RCC facility sits in the valley of Cliffdale Hollow Creek, which drains to the Mississippi River, but above the 100-year floodplain (M&E 1991; RCC 1996). Water from the Mississippi River is used as a source of non-contact cooling water and is pumped into a reservoir lake at the facility (M&E 1991). Stormwater runoff from the two landfills (SWMUs 1 and 3) is managed in settling/evaporation basins. Stormwater coming in contact with SWMU 1 is managed under a NPDES permit. Water is diverted to ditches east and west of the haul road. It flows through settling basins, where water is allowed to evaporate (RCC 2003). Stormwater not retained in the basin is discharged to Cliffdale Hollow Creek through monitored NPDES outfalls (RCC 2003). Stormwater runoff from SWMU 3 is controlled by a berm and forwarded to a settling basin; no water discharges from this settling basin (RCC 2003). No other documented permanent surface water bodies are on the property.

The surficial geology and hydrogeology of the site is dominated by unconsolidated materials and weathered bedrock. The limestone quarried at RCC is Ordovician Kimmswick Formation, consisting of massive bedded dolomite and interbedded limestone. The Kimmswick has a thickness of about 90 feet but is thinner at the site due to quarrying (M&E 1991). This bedrock is exposed at the surface in SWMUs 2 and 3, and is only about 3 feet below ground surface (bgs) in SWMU 4 (RCC 2005). The

[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 appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

Kimmswick overlies Ordovician Decorah Formation shales, which vary in thickness from a few feet to more than 40 feet thick (M&E 1991). Unconsolidated materials at the facility consist of layers of gravel, sand, silt, and clay; and of fill material (RCC 2005).

Groundwater at the facility is encountered in the unconsolidated material and in underlying bedrock. During the RFI, three monitoring wells were installed in bedrock in the area of SWMUs 2 and 3, and temporary piezometers were installed in unconsolidated materials at SWMUs 1, 9, 10, 11, 16, 17, and 19 (see Attachment 1) (RCC 2005). Groundwater is encountered in unconsolidated material at about 6 to 10 feet bgs (RCC 2005). Water level in the bedrock wells varies over 100 feet of absolute elevation (RCC 2005); presumably, these wells are completed in different limestone units. No information about groundwater flow direction is available, although groundwater gradients in unconsolidated material may follow surface topography, flowing toward Cliffdale Hollow Creek (see Figure 1).

Groundwater at the RCC facility is not contaminated. Groundwater samples were collected at RCC for the RFI from bedrock wells at SWMUs 2 and 3, and from direct-push probe holes at SWMUs 10, 11, 16, 17, and 19 (RCC 2005). Although temporary piezometers were installed at SWMUs 1 and 9, no groundwater samples could be collected from these locations. Groundwater was not encountered at SWMU 7 and no piezometer was installed. However, surface soil samples collected from SWMU were not contaminated.

Samples were analyzed for dissolved metals (SWMUs 2 and 3 only) and dissolved TPH (RCC 2005). VOCs were stored at the facility at the closed hazardous waste processing area. Although the VOCs tetrachloroethene, xylene, and toluene were detected in surface soil at the closed hazardous waste processing area, concentrations were below MDNR's leaching-to-groundwater target concentrations (Barr 1998; MDNR 2001). As a result, VOCs were not included in RFI groundwater analysis. Table 1 shows the maximum concentration of contaminants detected in groundwater during the RFI.

TABLE 1

MAXIMUM CONCENTRATIONS OF CONSTITUENTS IN GROUNDWATER, RCRA FACILITY INVESTIGATION

Constituent	Concentration (mg/L)	SWMU	Location	EPA MCL (mg/L)
Dissolved Metals				
Arsenic	0.0037	2-3	GW3	0.05/0.01*
Barium	0.208	2-3	GW2	2
Selenium	0.0042	2-3	GW3	0.05
Total Petroleum Hydrocarbons (TPH)				
TPH - All	4.35	19	GW1	10**
TPH - Diesel Range Organics	4.3	19	GW1	34.3***
TPH - Gasoline Range Organics	0.0517	19	GW1	18***
TPH - Motor Oil	1.9	2-3	GW3	31.8 (ORO)***

Notes:
Table derived from the RCRA facility investigation (RCC 2005).

* New MCL for Arsenic effective January 23, 2006
** MDNR groundwater target concentration (MDNR 2001)
*** MDNR groundwater default target level (MDNR 2005)
EPA U.S. Environmental Protection Agency
MCL EPA maximum contaminant level (EPA 2002)
MDNR Missouri Department of Natural Resources
mg/L Milligrams per liter
RCRA Resource Conservation and Recovery Act
SWMU Solid waste management unit
TPH Total petroleum hydrocarbons
ORO Oil Range Organics

3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

_____ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

4. Does "contaminated" groundwater discharge into surface water bodies?

_____ If yes - continue after identifying potentially affected surface water bodies.

_____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

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[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

_____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

_____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the discharge of "contaminated" groundwater into surface water be shown to be "currently acceptable" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes - continue after either:
1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR
2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):

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[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

_____ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no - enter "NO" status code in #8.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

8. Check the appropriate RCRA Info status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

__X__ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **River Cement Company** facility, EPA ID # **MOD050232560**, located at **100 River Cement Road, Festus, Missouri**. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

_____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

_____ IN - More information is needed to make a determination.

Completed by _____ Date 9/30/05
Assem Abdul
Project Manager, Treatment Unit
Hazardous Waste Program
Missouri Department of Natural Resources

Supervisor _____ Date 9/30/05
Richard A. Nussbaum, PE, RG
Chief, Corrective Action Unit
Hazardous Waste Program
Missouri Department of Natural Resources

Locations where References may be found:

Missouri Department of Natural Resources
1738 E. Elm Street
Jefferson City, Missouri 65101

EPA Region 7 - RCRA Files
901 North 5th Street
Kansas City, Kansas

Contact telephone and e-mail numbers

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REFERENCES

Barr Engineering Company. 1998. "Certification of River Cement Company HWF Facility RCRA Closure." August.

Environmental Protection Agency, U.S. (EPA). 2002. "List of Contaminants and their MCLs (Maximum Contaminant Levels)." EPA 816-F-02-013. July.

EPA. 2005. Envirofacts Data Warehouse MultiSystem Report for River Cement Company. Accessed June 1. On-line address: http://oaspub.epa.gov/enviro/multisys2.get_list?facility_uin=110000440229

Metcalf and Eddy, Inc. (M&E). 1991. "Preliminary RCRA Facility Assessment for River Cement Company, Festus, Missouri." February.

Missouri Department of Natural Resources (MDNR). 2001. "Cleanup Levels for Missouri." September 1.

Missouri Department of Natural Resources (MDNR). 2005. "Missouri Risk-Based Corrective Action Guidance Document for Petroleum Storage Tanks, March 2005

MDNR. 2003. Final Corrective Action Letter of Agreement, River Cement Company Facility, Selma Plant, Festus, Missouri. March 11.

River Cement Company (RCC). 1996. "Part B Permit Application." December.

RCC. 2003. "Site Operation, Maintenance, and Monitoring Plan." December 15.

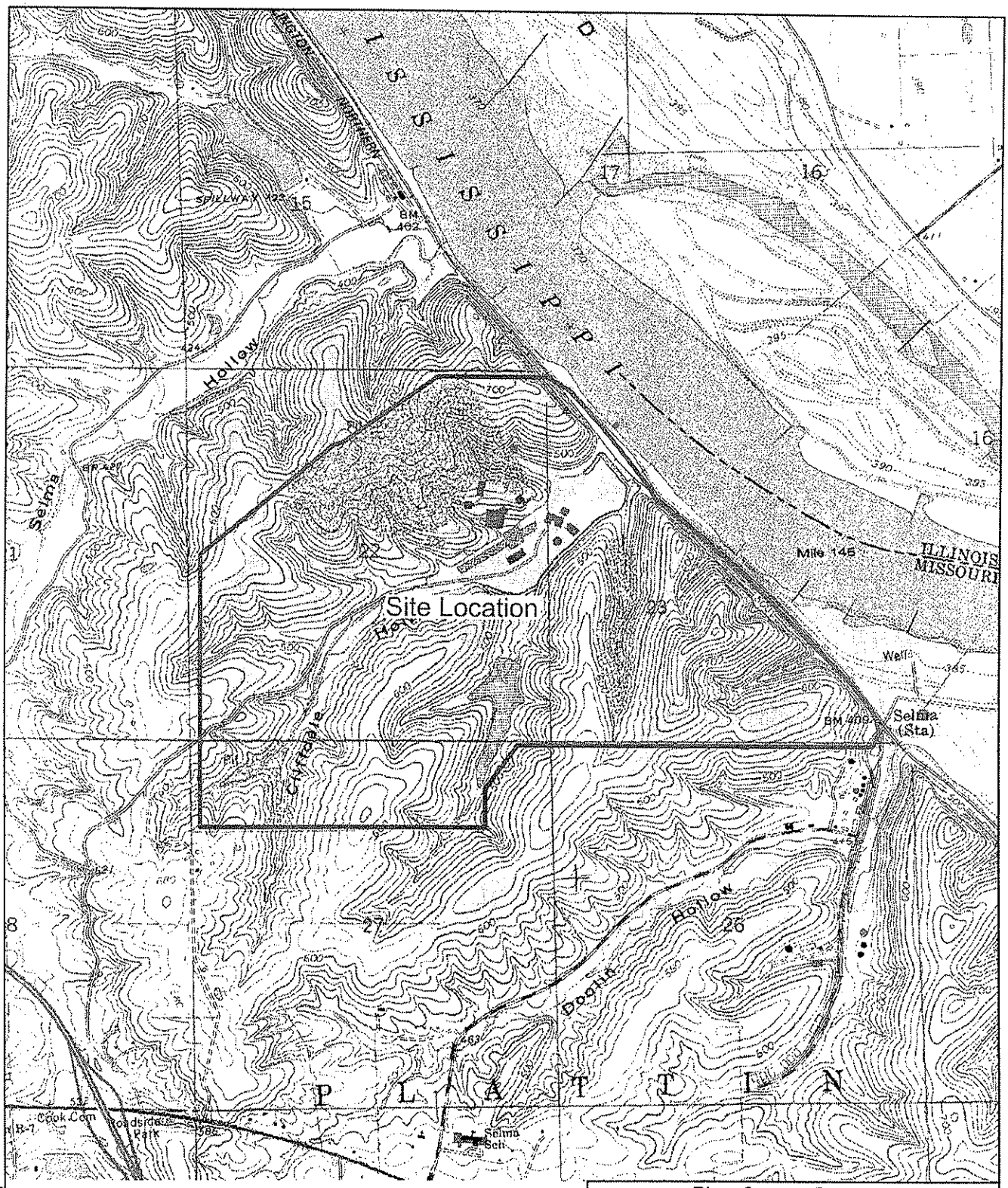
RCC. 2004a. "Quarterly Progress Report." January 27.

RCC. 2004b. "Quarterly Progress Report." July 9.

RCC. 2005. "Expedited Corrective Action Program RCRA Facility Investigation Report." July 6.

FIGURES

FIGURE 1 SITE LOCATION MAP



River Cement Company
Festus, Missouri

Figure 1
Site Location Map

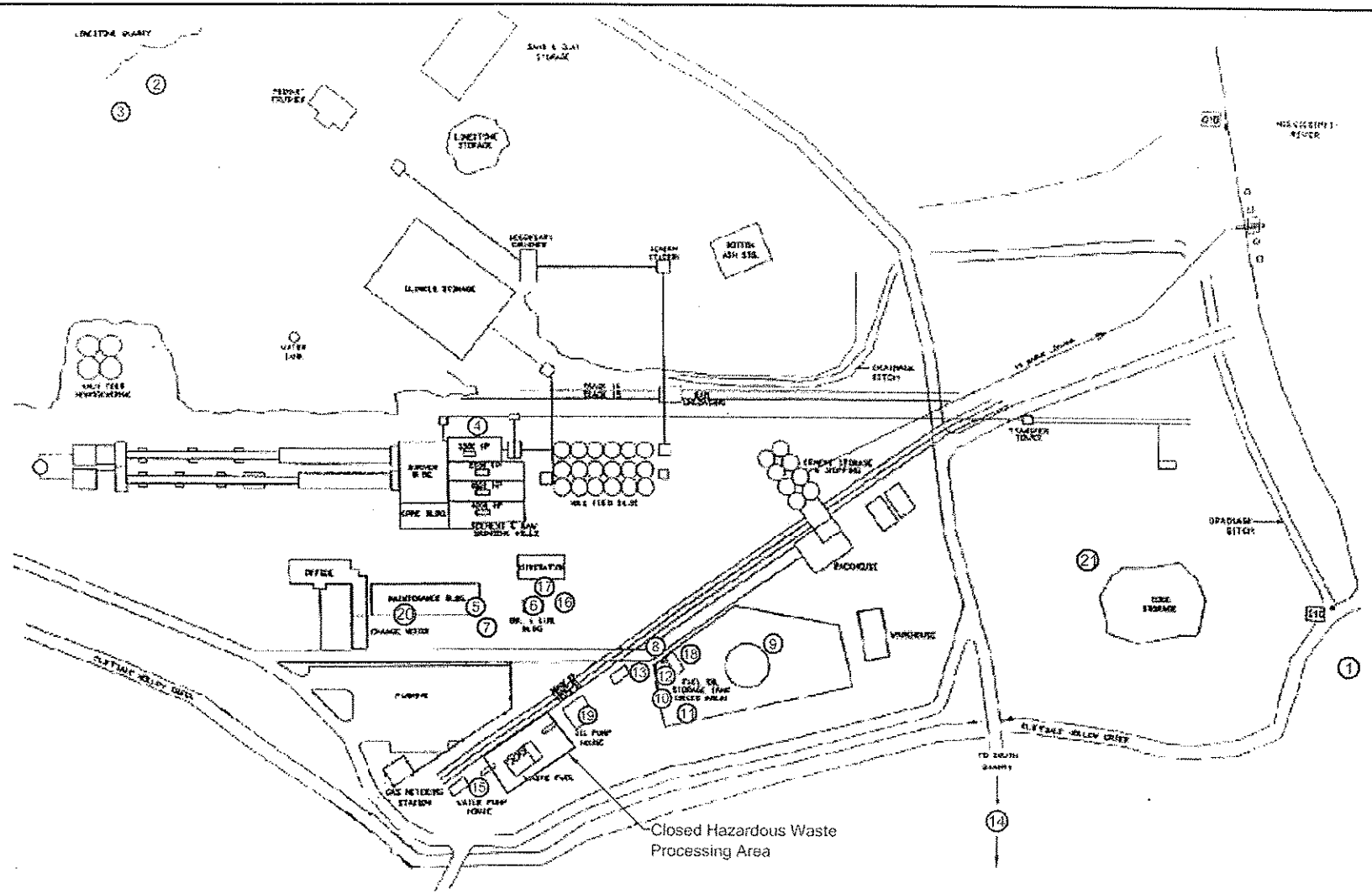
Tetra Tech EM Inc.

Date: 08/18/05 Drawn By: Roger Stutt Project No: G9017 1 R07 1 19 05 DN

Source: USGS Selma, MO-IL 7.5 Minute Topo Quad, 1964, PR 1982

G:\G9017\R07\119\505\MXD\RiverCement\dwg\Figure1.dwg

FIGURE 2 SWMU LOCATION MAP



Legend
⑭ SWMU location and ID

Not to Scale

Source: Modified from River Cement Company, 1992

River Cement Company
Festus, Missouri

Figure 2
Site Layout Map

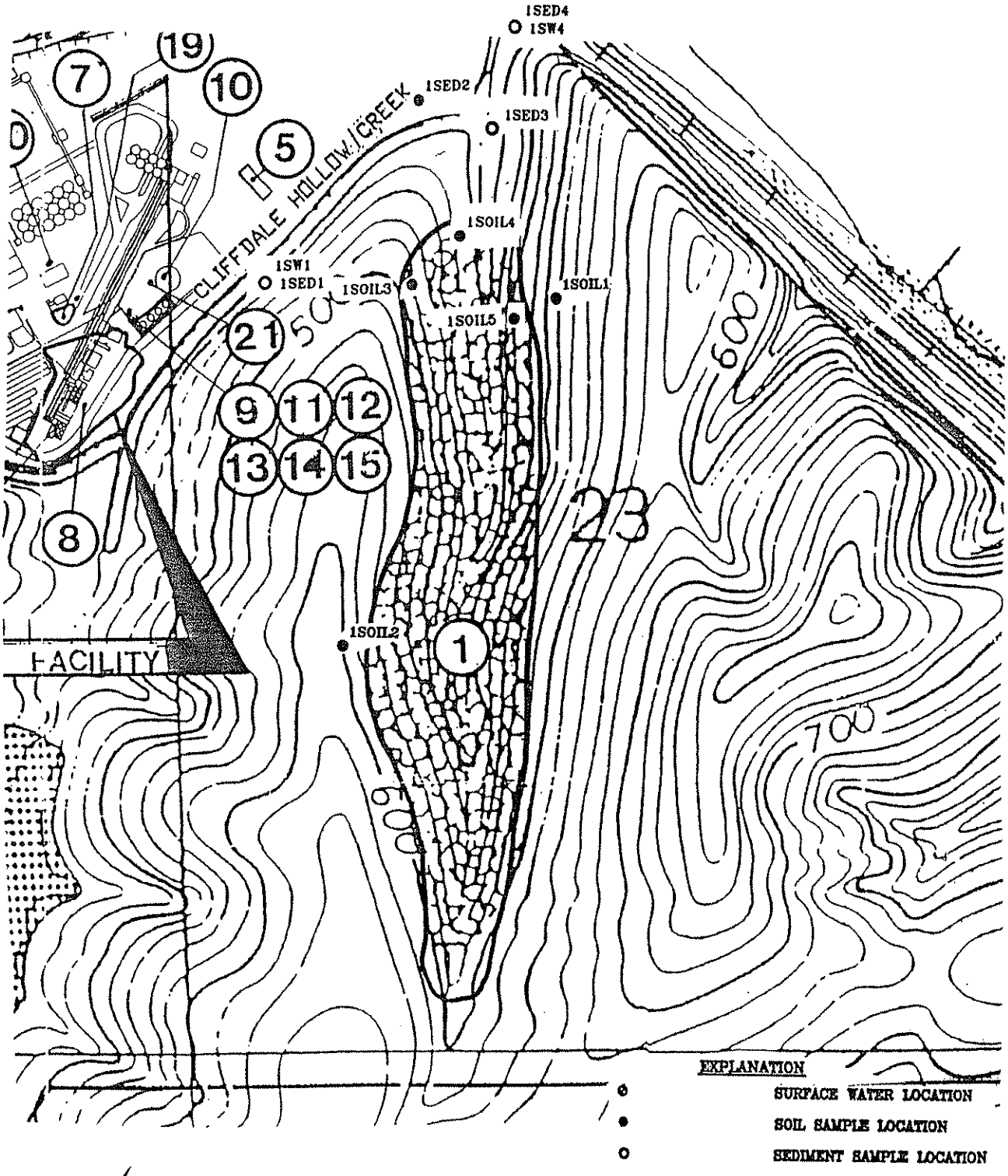
Tetra Tech EM Inc.

Date: 08/19/05 Drawn By: Roger Stull Project No: G9017 1 R07 1 19 05.DN

G:\G9017\R07\19\05\DN\RiverCement\dwg\Figure2.dwg

ATTACHMENT 1

SAMPLE LOCATION MAPS

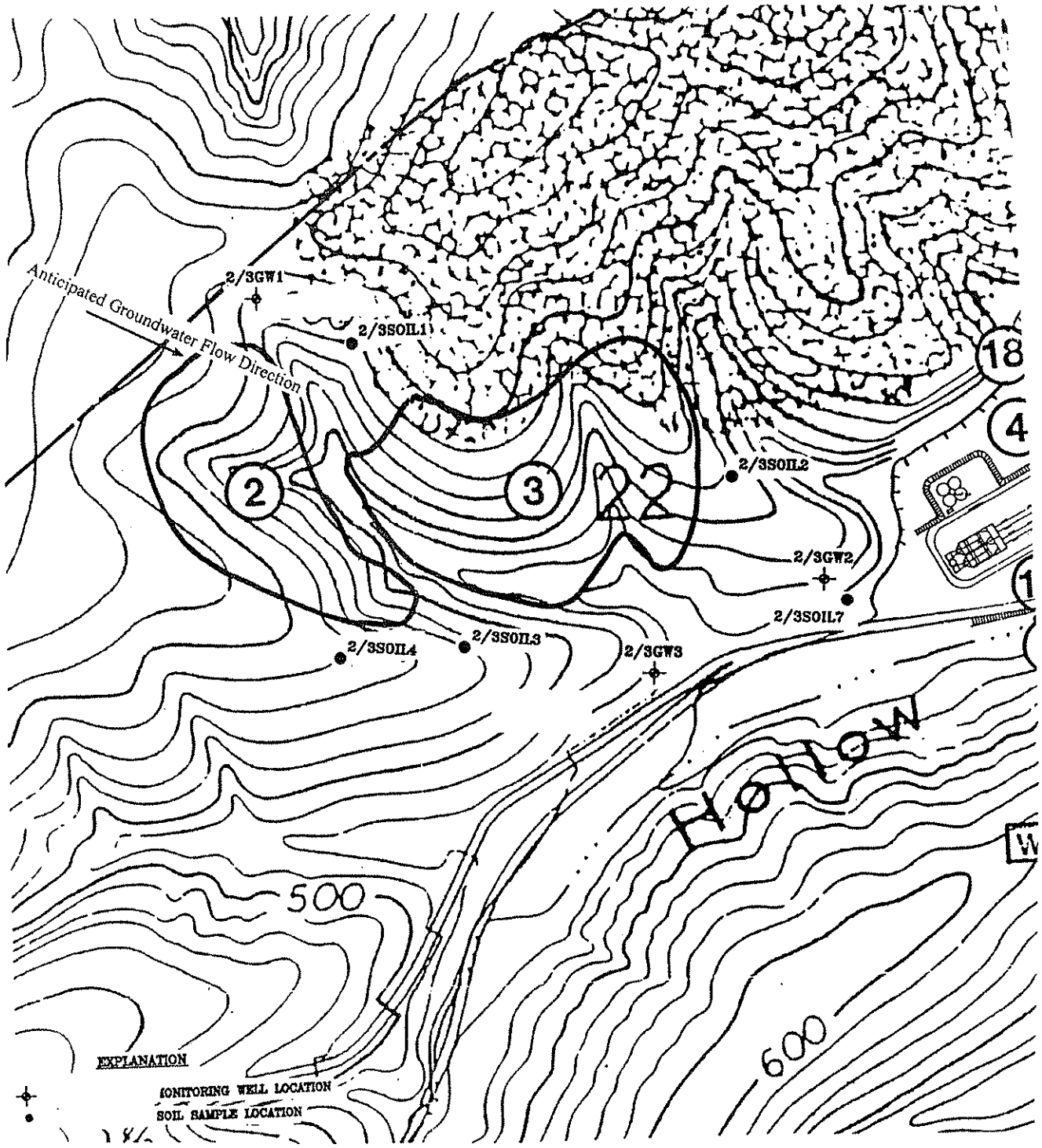


SAMPLE LOCATION MAP
SWMU 1
RIVER CEMENT COMPANY
FESTUS, MISSOURI

FIGURE 3

NOT TO SCALE

CHECKED BY:	DRAWN BY:	DATE DRAWN:	DRAWING #:	REVISION:
	ARS	04-05-00	000053	



SAMPLE LOCATION MAP SWMU 2 AND SWMU 3 RIVER CEMENT COMPANY FESTUS, MISSOURI				FIGURE 4 NOT TO SCALE
CHECKED BY:	DRAWN BY:	DATE DRAWN:	DRAWING #:	REVISION:
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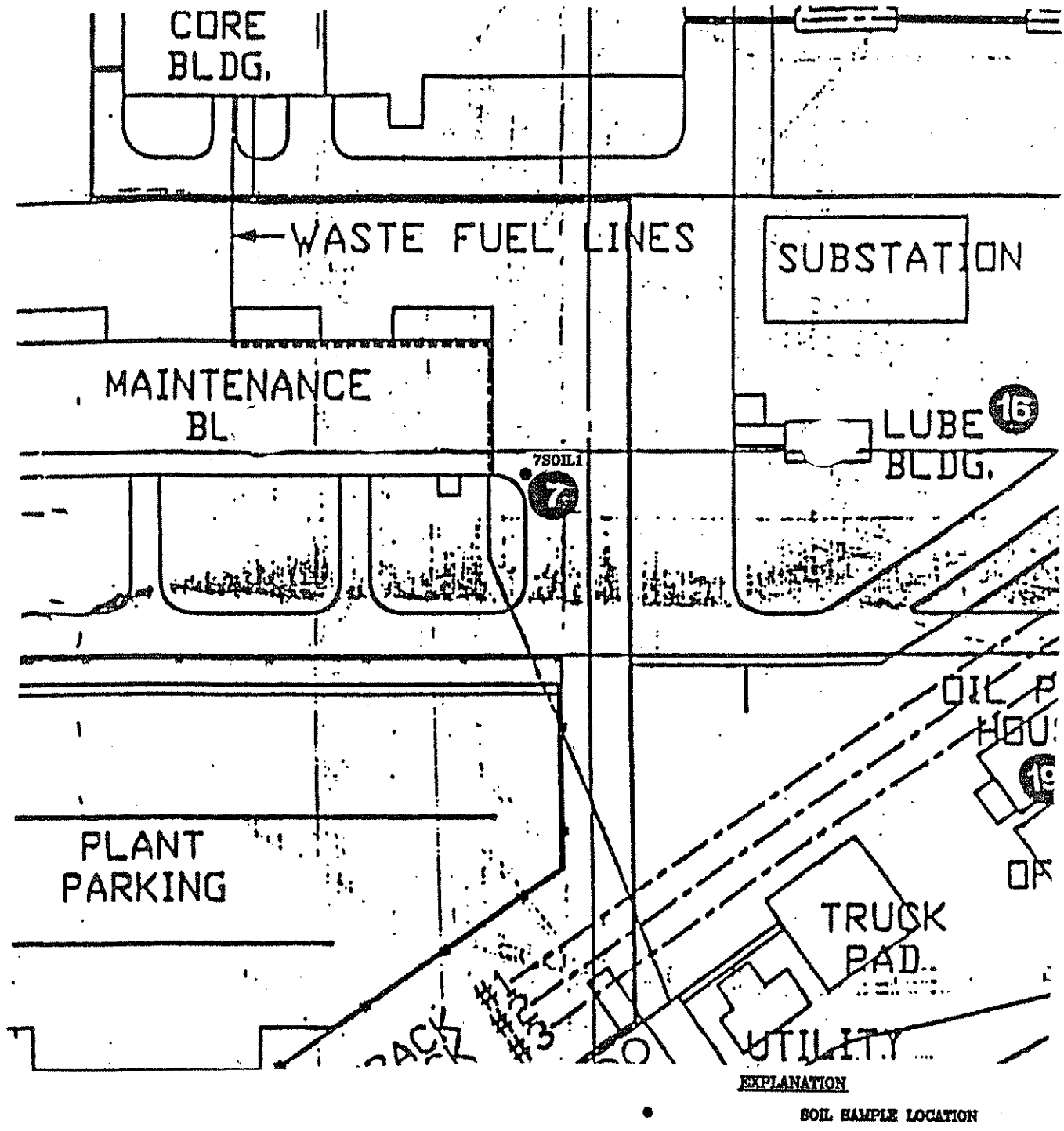
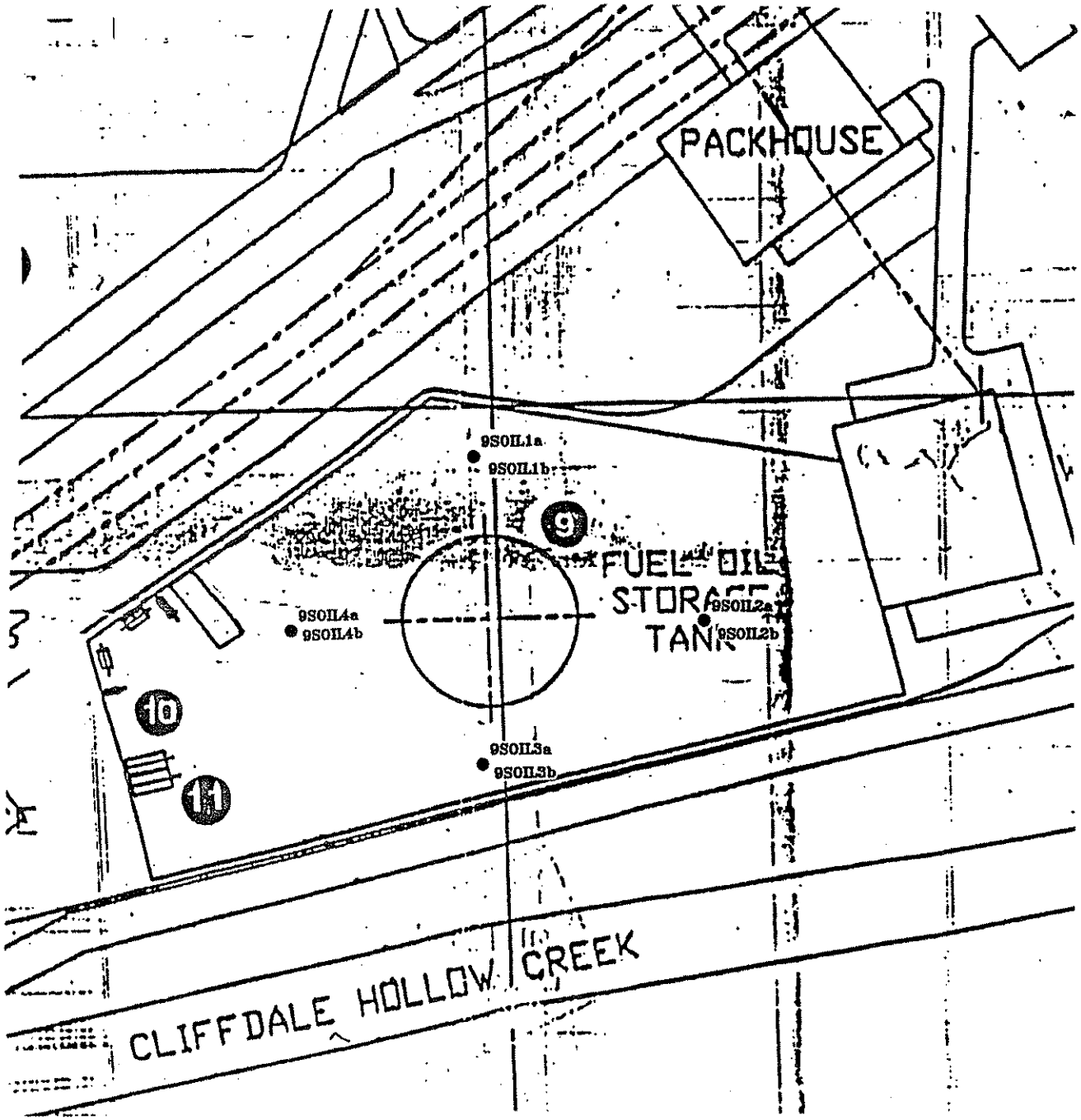


SAMPLE LOCATION MAP SWMU 7 RIVER CEMENT COMPANY FESTUS, MISSOURI				FIGURE 5 NOT TO SCALE
CHECKED BY:	DRAWN BY: ARS	DATE DRAWN: 04-05-00	DRAWING #: 000053	REVISION:

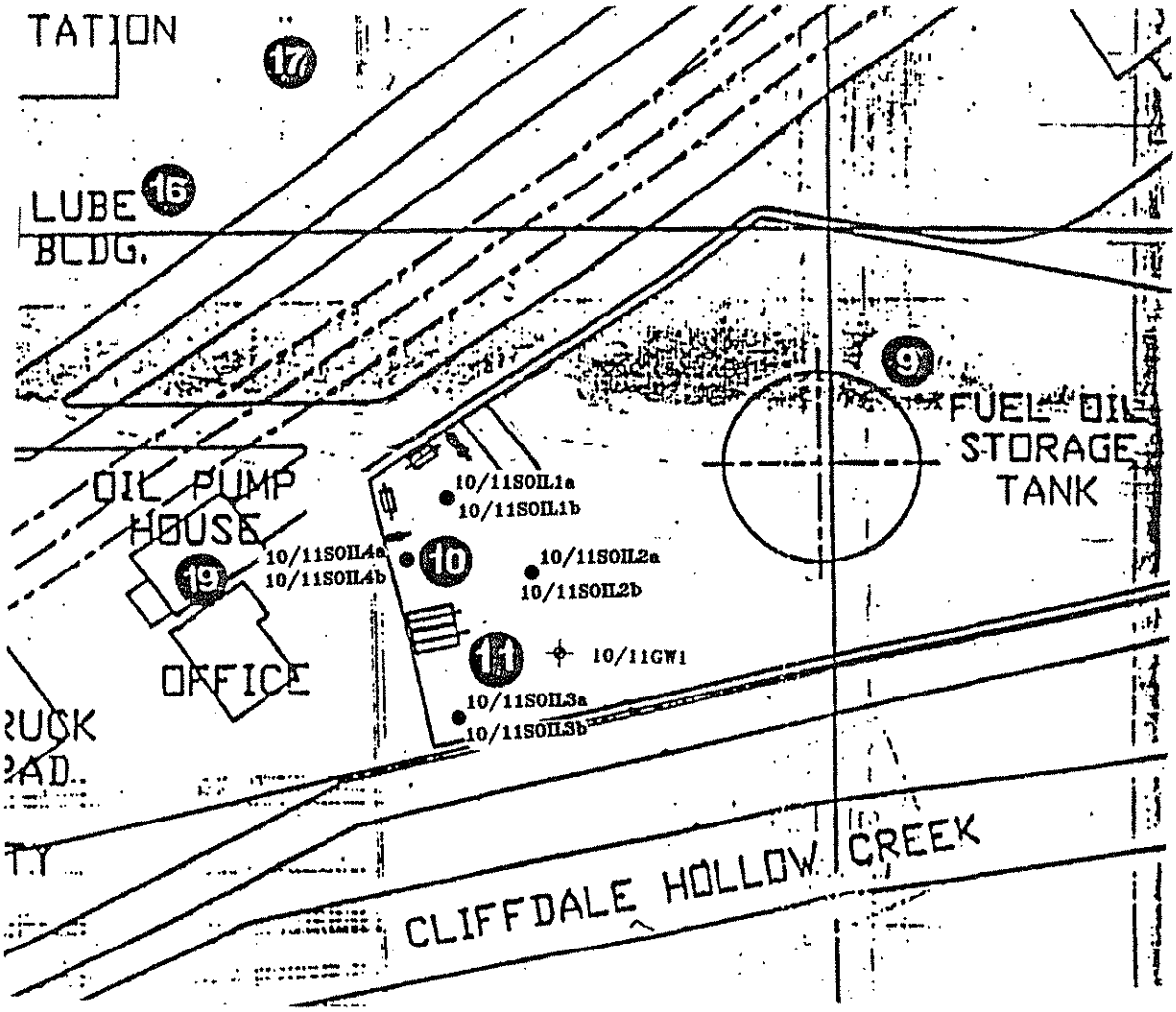


EXPLANATION

● SOIL SAMPLE LOCATION

N

SAMPLE LOCATION MAP SWMU 9 RIVER CEMENT COMPANY FESTUS, MISSOURI			FIGURE 6 NOT TO SCALE	
CHECKED BY:	DRAWN BY:	DATE DRAWN:	DRAWING #:	REVISION:
	ARS	04-05-00	000053	

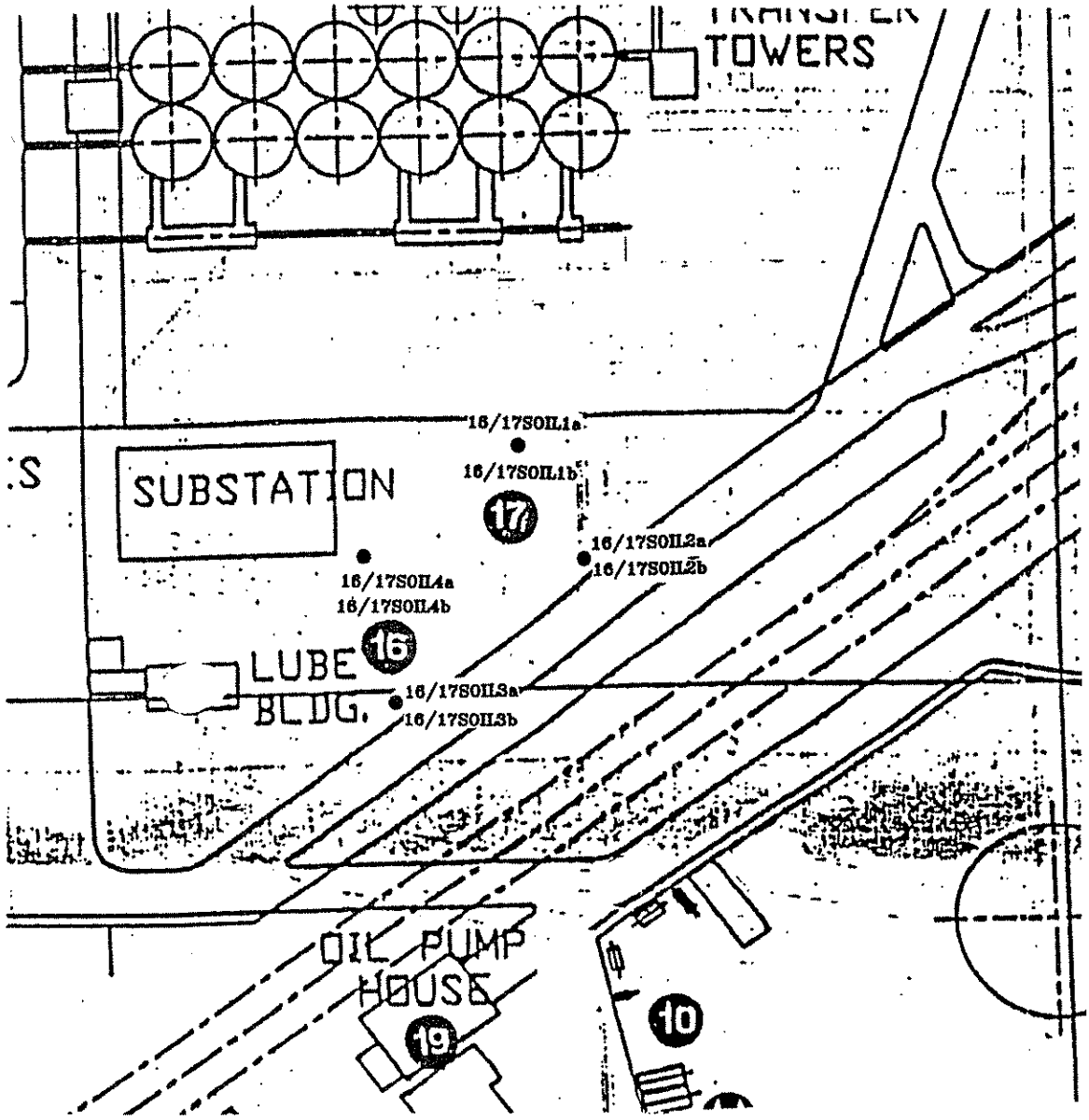


EXPLANATION

- ● **SOIL SAMPLE LOCATION**
- ⌖ GROUNDWATER SAMPLE LOCATION

N

SAMPLE LOCATION MAP SWMU 10 AND SWMU 11 RIVER CEMENT COMPANY FESTUS, MISSOURI				FIGURE 7 NOT TO SCALE
CHECKED BY:	DRAWN BY:	DATE DRAWN:	DRAWING #:	REVISION:
	ARS	04-05-00	000053	



EXPLANATION

● SOIL SAMPLE LOCATION

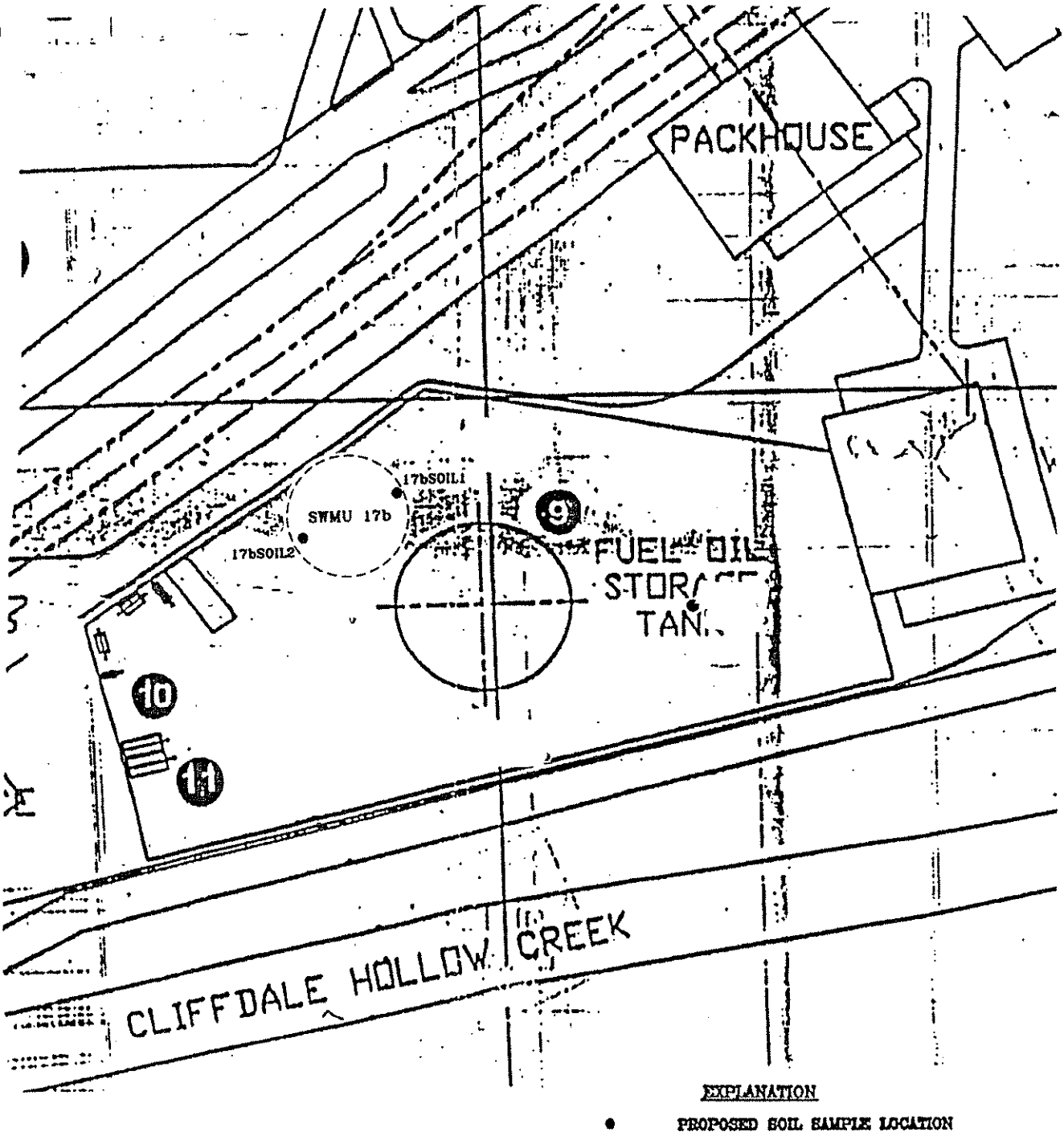
N

SAMPLE LOCATION MAP
SWMU 16 AND SWMU 17
RIVER CEMENT COMPANY
FESTUS, MISSOURI

FIGURE 8

NOT TO SCALE

CHECKED BY:	DRAWN BY:	DATE DRAWN:	DRAWING #:	REVISION:
	ARS	04-05-00	000053	



EXPLANATION

● PROPOSED SOIL SAMPLE LOCATION

N

SAMPLE LOCATION MAP SWMU 9 RIVER CEMENT COMPANY FESTUS, MISSOURI				FIGURE 9 NOT TO SCALE
CHECKED BY:	DRAWN BY:	DATE DRAWN:	DRAWING #:	REVISION:
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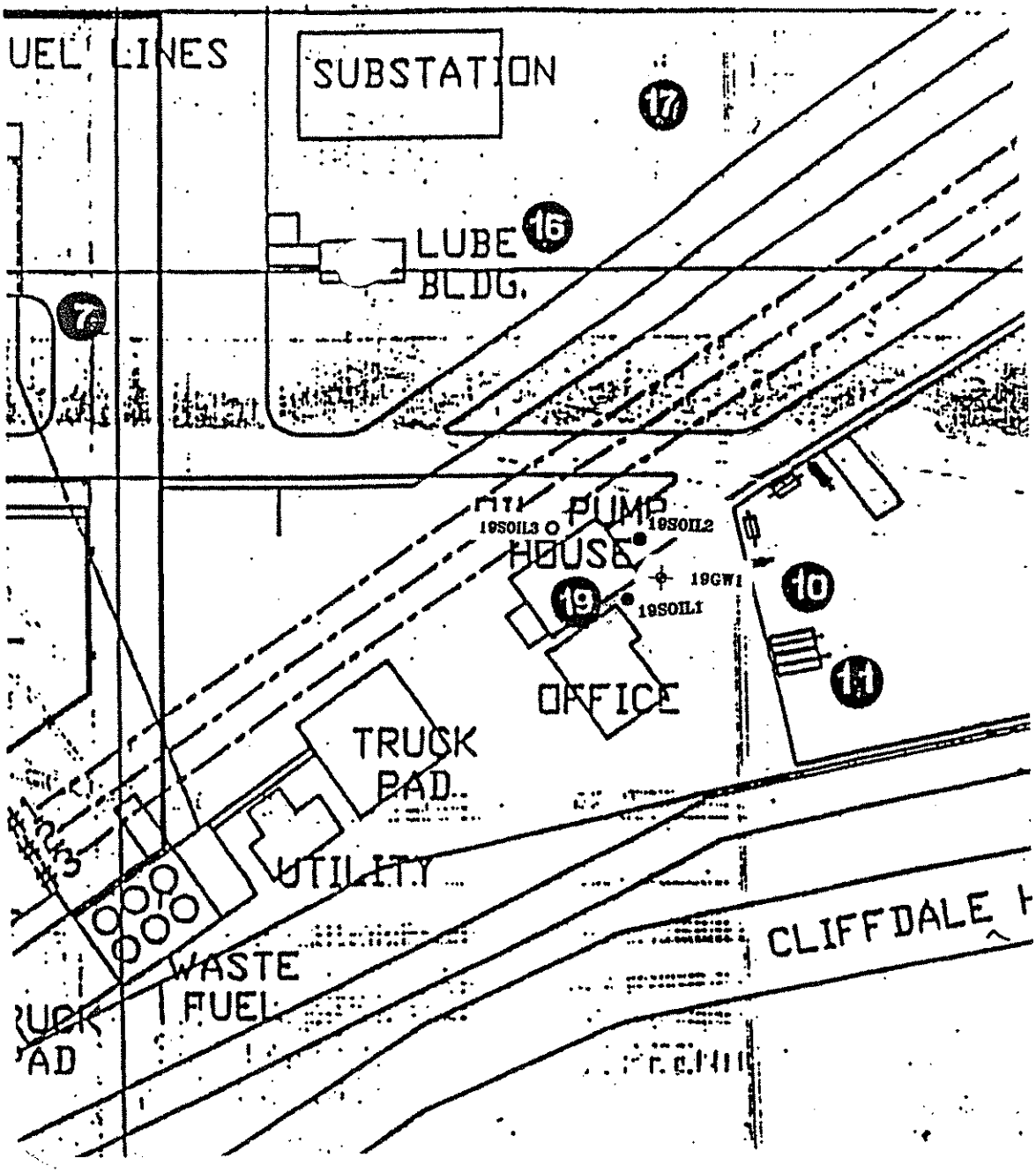

EXPLANATION

- ● PROPOSED SOIL SAMPLE LOCATION
- ⌖ POSSIBLE GROUNDWATER SAMPLE LOCATION

N

SAMPLE LOCATION MAP
SWMU 19
RIVER CEMENT COMPANY
FESTUS, MISSOURI

FIGURE 10

NOT TO SCALE

CHECKED BY:	DRAWN BY:	DATE DRAWN:	DRAWING #:	REVISION:
	ARS	04-05-00	000053	