RCCC HZ/RC/TE
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DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: **Sasol North America Lake Charles Chemical Complex**
Facility Address: **2201 Old Spanish Trail, Westlake (Calcasieu Parish), Louisiana**
Facility EPA ID #: LAR 000041087

I. 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?

__X__ 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

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

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) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			**Groundwater in the 10-Foot, 25-Foot, 50-Foot, 80-Foot, and 200-Foot Sands is impacted with various chlorinated solvents (primarily 1,2-DCA and vinyl chloride) above RECAP Standards. However, groundwater is not contacted; prior to excavation activities at the facility, Sasol's Soil Management Plan is implemented: the area is evaluated and appropriate personal protective equipment (PPE) is used based on the findings. Contaminated groundwater in the 10-Foot, 25-Foot, 50-Foot, and 80-Foot Sands is managed by groundwater pumping and no contaminated water in these zones migrates off-site. In the 200-Foot Sand, a small contaminated plume is present a few hundred feet upgradient from the southern property line. Remediation activities are underway.**
Air (indoors)		X		**Typically occupied enclosed structures that are situated above areas of known shallow groundwater contamination are buildings with positive pressure or are buildings that are generally open to air flow and do not concentrate vapors.**
Surface Soil (e.g., <2 ft)	X			**Surface soil concentrations of benzene (maximum of 36.4 mg/kg) in a small are of the Ethylene Unit exceed MO-2 RECAP Standards but are under concrete.**
Surface Water		X		**Surface water concentrations do not exceed applicable RECAP Standards; for metals analyses, filtered results were used in the evaluation.**
Sediment	X			**As presented in the Phase 1 RFI, sediment concentrations of two analytes (benzo(a)pyrene and dibenz(a,h)anthracene) in Fabacher Ditch exceed conservative RECAP soil standards (SS for direct contact). However, these standards are overly protective for site exposures and an NFA-ATT has been granted.**
Subsurface Soil (e.g., >2 ft)	X			**Subsurface soil in some areas may exceed MO-2 RECAP standards for some constituents. However, prior to excavation activities at the facility, Sasol's Soil Management Plan is implemented; the area is evaluated and appropriate PPE are used based on the findings;**

		as part of the area evaluation, sampling is often performed to determine the PPE needed. In addition, due to the shallow groundwater conditions throughout the facility, most subsurface soil contamination is considered to be associated with the groundwater and not the soil medium.
Air (outdoors)	X	**Ambient air is not expected to be impacted above risk-based levels. There is no source in the surface soil and most impacted shallow groundwater is situated below concrete surfaces.**

_____ 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.

__X__ 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): This EI was prepared using the following sources:

LDEQ, 2003. Risk Evaluation/Corrective Action Program (RECAP). Soil and groundwater standards, surface water risk-based levels (GW1 standards), sediment risk-based levels (Soil screening standards).

CH2M Hill, 2003. RCRA Facility Investigation (RFI). Phase 1 Report – Final. Volume 1: Text. May.

CH2M Hill, 2008. Management Option 3 Work Plan. Ethylene Unit. June.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

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[1]
Groundwater	No	No	No	No	No	No	No
Air (indoors)	--	--	--	--	--	--	--
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	No	No	No
Surface Water	--	--	--	--	--	--	--
Sediment	No	No	No	No	No	No	No
Soil (subsurface e.g., >2 ft)	No	No	No	No	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

Rationale and Reference(s): Two PAHs are present at former AOI-13 (since been given NFA-ATT finding) at levels above MO-1 RS for industrial land use. However, the PAHs are not expected to be related to the site, but rather the presence of rail ties (associated with the rail spur) and/or the adjacent asphalt roadway. The surface of AOI-13 is covered with grass, trees, railroad tracks, and a truck turn-around. Surface soil (0-3ft) at AOI-13 may be accessible to outdoor workers and construction workers. However, landscapers are present for approximately 4 hours per month and site workers are required to wear PPE.

Surface soil at the Ethylene Unit exceeding MO-2 RECAP Standards is situated below concrete. It is inaccessible to workers.

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[2] (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)?

__X__ 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):_____

[2] If 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.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

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):_____

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

6. Check the appropriate RCRIS 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):

_X_ 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 Sasol North America Lake Charles Chemical Complex facility, EPA ID # **LAR 000041087** , located at Westlake (Calcaseiu Parish) Louisiana 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 (signature) _____ Date 11-8-11
(print) Laura LeBouef
(title) Geologist

Supervisor (signature) Lewis Donlon Date 11/8/11
(print) LEWIS DONLON
(title) GEOL. SUPERVISOR
(EPA Region or State) LDEQ

Locations where References may be found:

_____
_____
_____
_____
_____

Contact telephone and e-mail numbers

(name)_____
(phone #)_____
(e-mail)_____

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.

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2003

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name:	**Sasol North America, Inc (Formerly CONDEA Vista Co)**
Facility Address:	**2201 Old Spanish Trail, Westlake LA 70669**
Facility EPA ID #:	**LAR 000041087 (formerly LAD 086478047) AI # 3271**

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?

   _X_ 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

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

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) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			**EDC, TCA, metals>MCL and RECAP criteria**
Air (indoors)[2]		X		**No problems, not expected with site data**
Surface Soil (e.g., <2 ft	X			**EDC, TCA, metals>MCL and RECAP criteria**
Surface Water		X		**Surface Waters not contaminateed**
Sediment		X		**Sediment samples <RECAP standards**
Subsurf. Soil (e.g., >2 ft)	X			**EDC, TCA, metals >MCL and RECAP criteria**
Air (outdoors)		X		**No contaminants known to be in outdoor air from releases subject to RCRA Corrective Action**

_____ 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.

__X__ 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): Numerous documents reporting the results of site-wide contaminant investigations have been prepared and submitted to appropriate regulatory agencies. Attachment 3 is a listing of the relevant ones prepared prior to December 1996. Since that time the following documents have been prepared: Hydrogeologic Report, CH2MHILL, 1996; Rate and Extent Report, CH2MHILL, 1996; Task 9 Deliverables Report, CH2MHILL, 1998; Draft Phase I RFI Report, CH2MHILL, 1999; Updated Contaminant Distribution and Stratigraphic Setting, CH2MHILL, 2002; RFI Phase I Report, CH2MHILL, 2003; RFI Phase I Report – Final, CH2MHILL, 2003. Additionally, Quarterly and Annual Groundwater Monitoring Reports are routinely submitted to the LDEQ.

Footnotes:

[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).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest 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.

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	yes	no	yes			no
Air (indoors)	X	X	X				
Soil (surface, e.g., <2 ft)	no	yes	no	yes	no	no	no
Surface Water	no	no			no	no	no
Sediment	no	no			no	no	no
Soil (subsurface e.g., >2 ft)				yes			no
Air (outdoors)	X	X	X	X	X		

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

Rationale and Reference(s): For all "yes" answers in the above table, the only "potentially completed" exposure pathways, as discussed in #2 above, at the LCCC involve site workers/contractors during construction, excavation, or maintenance/monitoring activities associated with the groundwater/RFI monitoring , investigation and remediation programs. However, these individuals are trained personnel and OSHA guidelines are followed and monitored during work in these infrequent conditions. References are the same as listed for question Number 2 on page 2. Past site work has shown groundwater to be "contaminated", but no individual(s) has been identified as using the groundwater from within the known areas of contamination. No day-care, recreation or food pathways are known or expected. The facility is fenced and signs posted to deter trespassers.

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

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)?

__X__ 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): No human health risk assessment has yet been completed for this site. However, all known contaminants and concentrations, when combined with the site geologic, hydrogeologic and overall physical setting, strongly indicate that exposure due to "contamination subject to RCRA corrective action" at this facility "can not be reasonably expected to be significant". For all "yes" answers in the above table, the only "potentially completed" exposure pathways, as discussed in #2 above, at the LCCC involve site workers/contractors during construction, excavation, or maintenance/monitoring activities associated with the groundwater/RFI monitoring , investigation and remediation programs. However, these individuals are trained personnel and OSHA guidelines are followed and monitored during work in these infrequent conditions. References are the same as listed for question Number 2 on page 2. Past site work has shown groundwater to be "contaminated", but no individual(s) has been identified as using the groundwater from within the known areas of contamination. No day-care, recreation or food pathways are known or expected. The facility is fenced and signs posted to deter trespassers.

[4] If 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.

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):_____

6. Check the appropriate RCRIS 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):

_X_ 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 _____ _____ facility, EPA ID #_____, located at _____ 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 Ellen Broussard Date 3/31/03
Ellen Broussard
Geologist 3

Supervisor Lewis A. Donlon Date 3/31/03
Lewis A. Donlon
Supervisor
Louisiana Department of Environmental Quality

Locations where References may be found:

Louisiana Dept of Environmental Quality, Baton, Rouge, LA
Sasol North America, Inc., Westlake, LA

Contact telephone and e-mail numbers

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(phone #) (337) 491-2667
(e-mail) ellenb@deq.state.la.us

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.

LCCC former Sasol North

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Sasol North America, Inc (Formerly CONDEA Vista Co)
Facility Address: 2201 Old Spanish Trail, Westlake LA 70669
Facility EPA ID #: LAR 000041087 (formerly LAD 086478047)

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.

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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS 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) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

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

   _____ 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): Groundwater contamination on- and off-site by organic compounds and metals has been documented and reported to regulatory agencies. The site groundwater investigation and remediation activities have been ongoing for several years. The attached table (Attachment 3) lists the primary geologic and hydrogeologic data collection investigation reports conducted at the site prior to 1996. Since that time several additional documents have been developed and submitted. These include: Hydrogeologic Report, CH2MHILL, 1996; Rate and Extent Report, CH2MHILL, 1996; Task 9 Deliverables Report, CH2MHILL, 1998; Draft Phase I RFI Report, CH2MHILL, 1999; Complete Delineation of Contaminant Plumes and Potential Source Areas for Enhancing the Groundwater Recovery System, CH2MHILL, 2000; Updated Contaminant Distribution and Stratigraphic Setting, CH2MHILL, 2002; RFI Phase I Report, CH2MHILL, 2003; RFI Phase I Report – Final, CH2MHILL, 2003. Additionally, Quarterly and Annual Groundwater Monitoring Reports are routinely submitted to the LDEQ.

Footnotes:

[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).

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)?

_X_ 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): Groundwater is known to be "contaminated" in the following water-bearing units: 10-Foot Sand, 25-Foot Sand, 50-Foot Sand, and 80-Foot Sand. Migration of contaminated groundwater is controlled by a remediation system consisting of 21 vertical and 7 horizontal recovery wells. Pumping rates have been adjusted, and have stabilized, and potentiometric maps now consistently indicate that containment is being achieved along the property line on Old Spanish Trail. The leading edge of the plume in all water-bearing units has been stabilized. Contaminant concentration and potentiometric maps are included as Attachment 4.

[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.

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

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

__X__ 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):_____

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):_____

[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?"

__X__ 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): Sasol has RCRA / HSWA permits and a state Groundwater Order which all contain groundwater monitoring provisions. Currently the company operates 28 groundwater recovery wells for contaminant mass removal and plume control. These recovery wells will continue to be operated and monitored.

8. Check the appropriate RCRIS 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 Sasol North America, Inc. facility, EPA ID # LAR-000041087, located at 2201 Old Spanish Trail, Westlake, LA. 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 Ellen Broussard Date 3/31/03
Ellen Broussard
Geologist 3

Supervisor Lewis A. Donlon Date 3/31/03
Lewis A. Donlon
Supervisor
Louisiana Department of Environmental Quality

Locations where References may be found:

Louisiana Dept of Environmental Quality, Baton, Rouge, LA
Sasol North America, Inc., Westlake, LA

Contact telephone and e-mail numbers

(name) Ellen Broussard
(phone #) (337) 491-2667
(e-mail) ellenb@deq.state.la.us

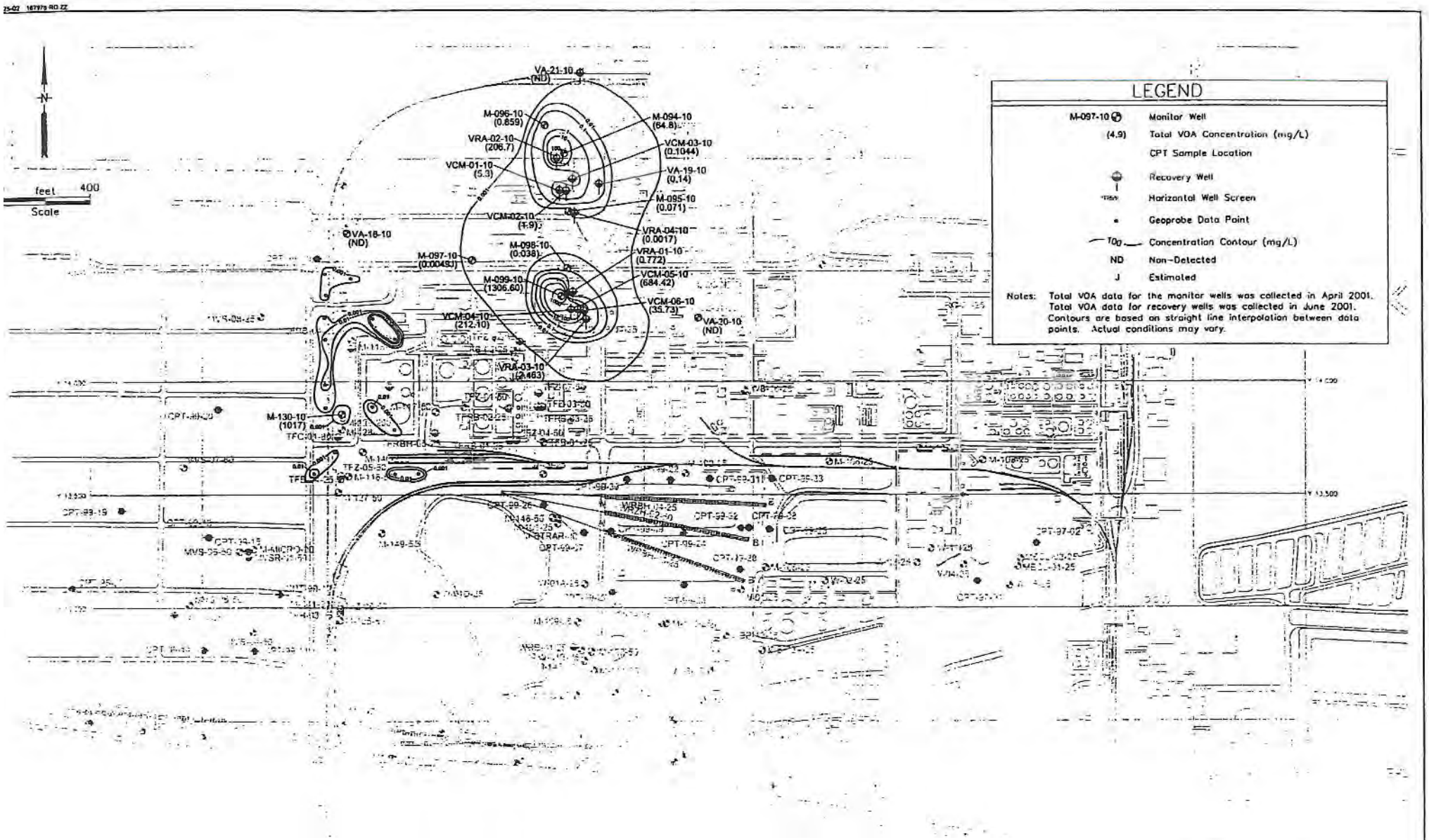
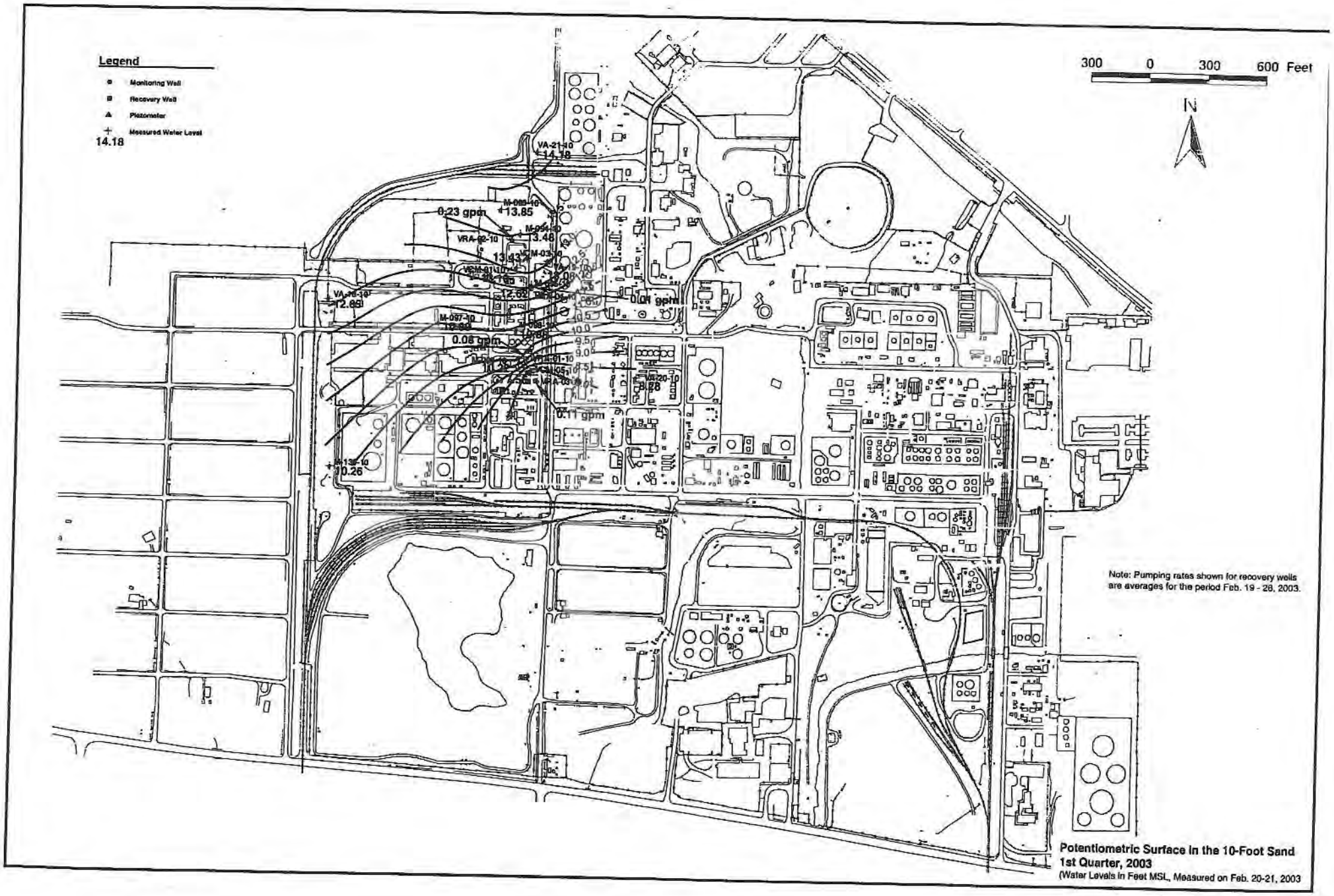


FIGURE 11
TOTAL VOA CONCENTRATIONS IN THE 10-FOOT SAND
SPRING 2001 GROUNDWATER SAMPLING EVENT
Sasol North America, Inc., Lake Charles Chemical Complex

CH2MHILL



Potentiometric Surface in the 10-Foot Sand
1st Quarter, 2003
(Water Levels in Feet MSL, Measured on Feb. 20-21, 2003

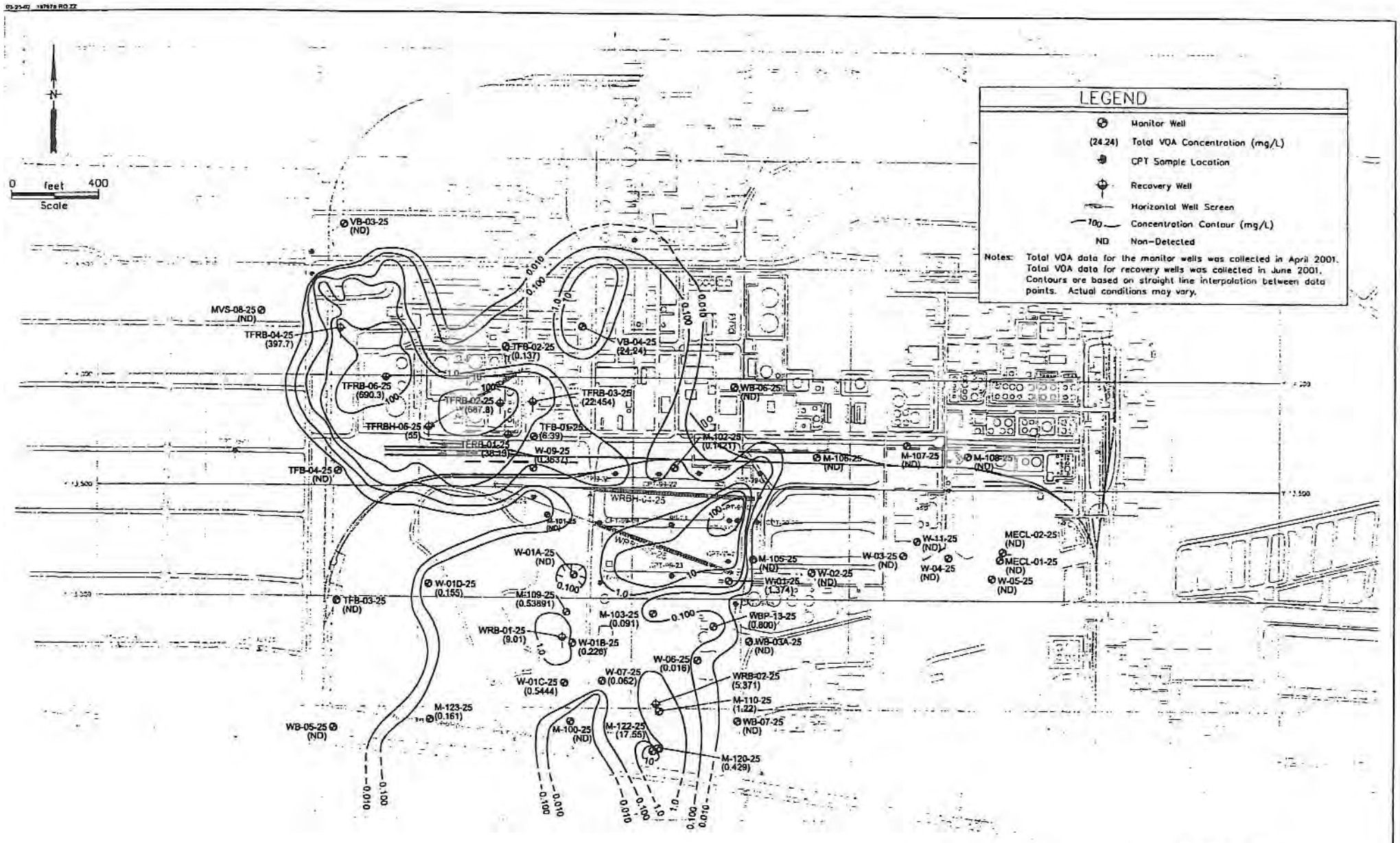
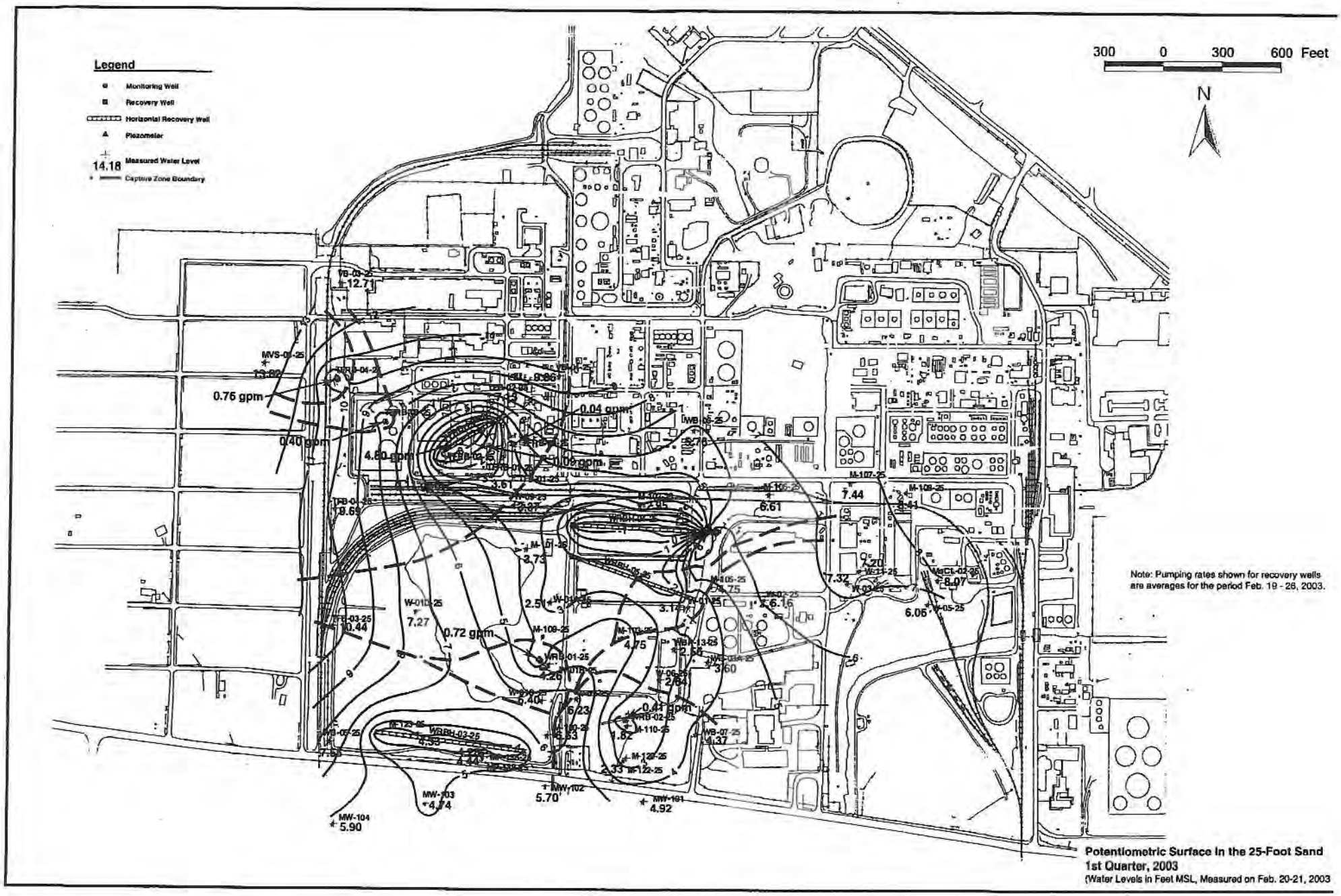


FIGURE 13
TOTAL VOA CONCENTRATIONS IN THE 25-FOOT SAND
SPRING 2001 GROUNDWATER SAMPLING EVENT
Sasol North America, Inc., Lake Charles Chemical Complex

CH2MHILL



Potentiometric Surface in the 25-Foot Sand
1st Quarter, 2003
(Water Levels in Feet MSL, Measured on Feb. 20-21, 2003

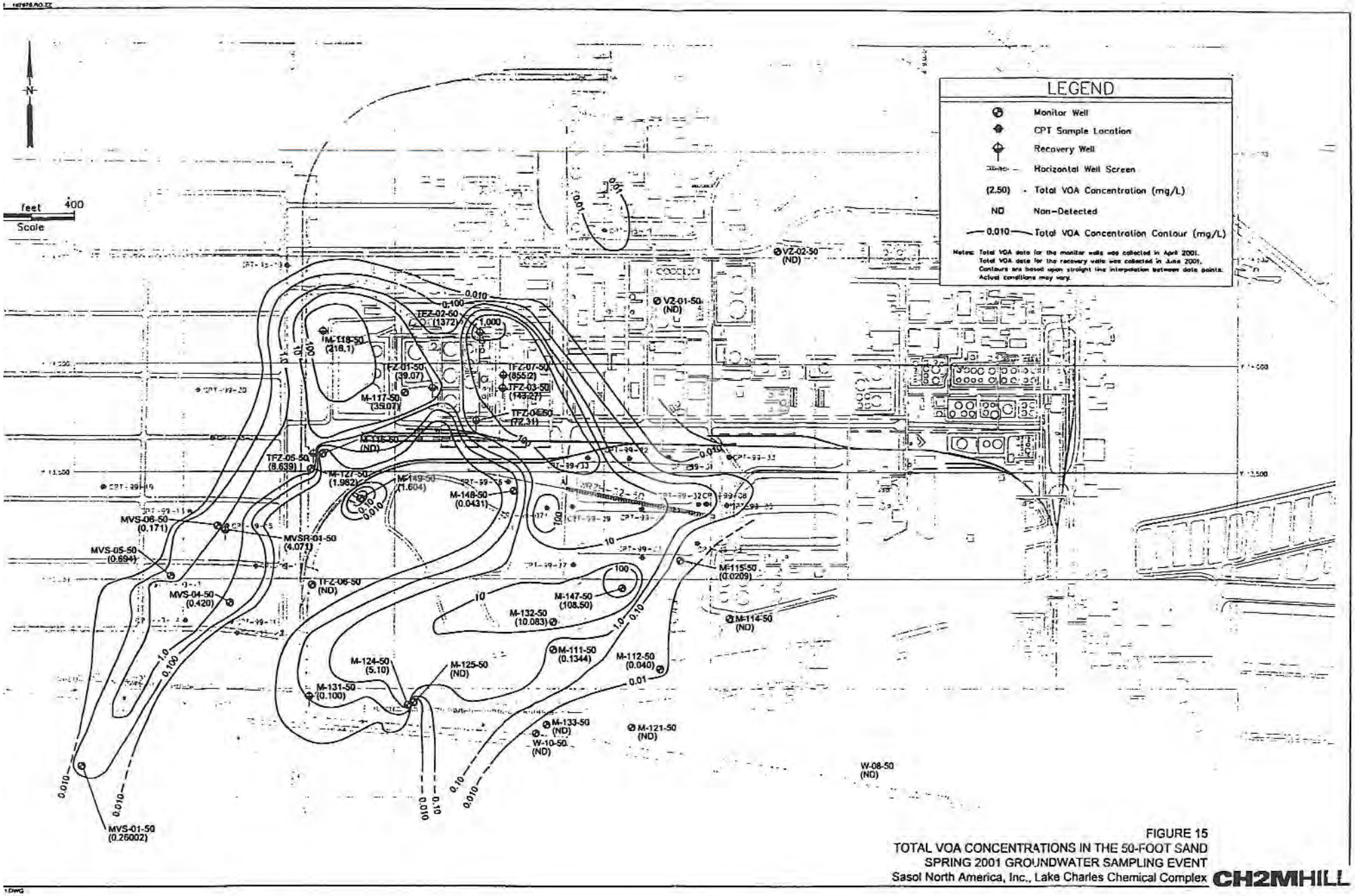
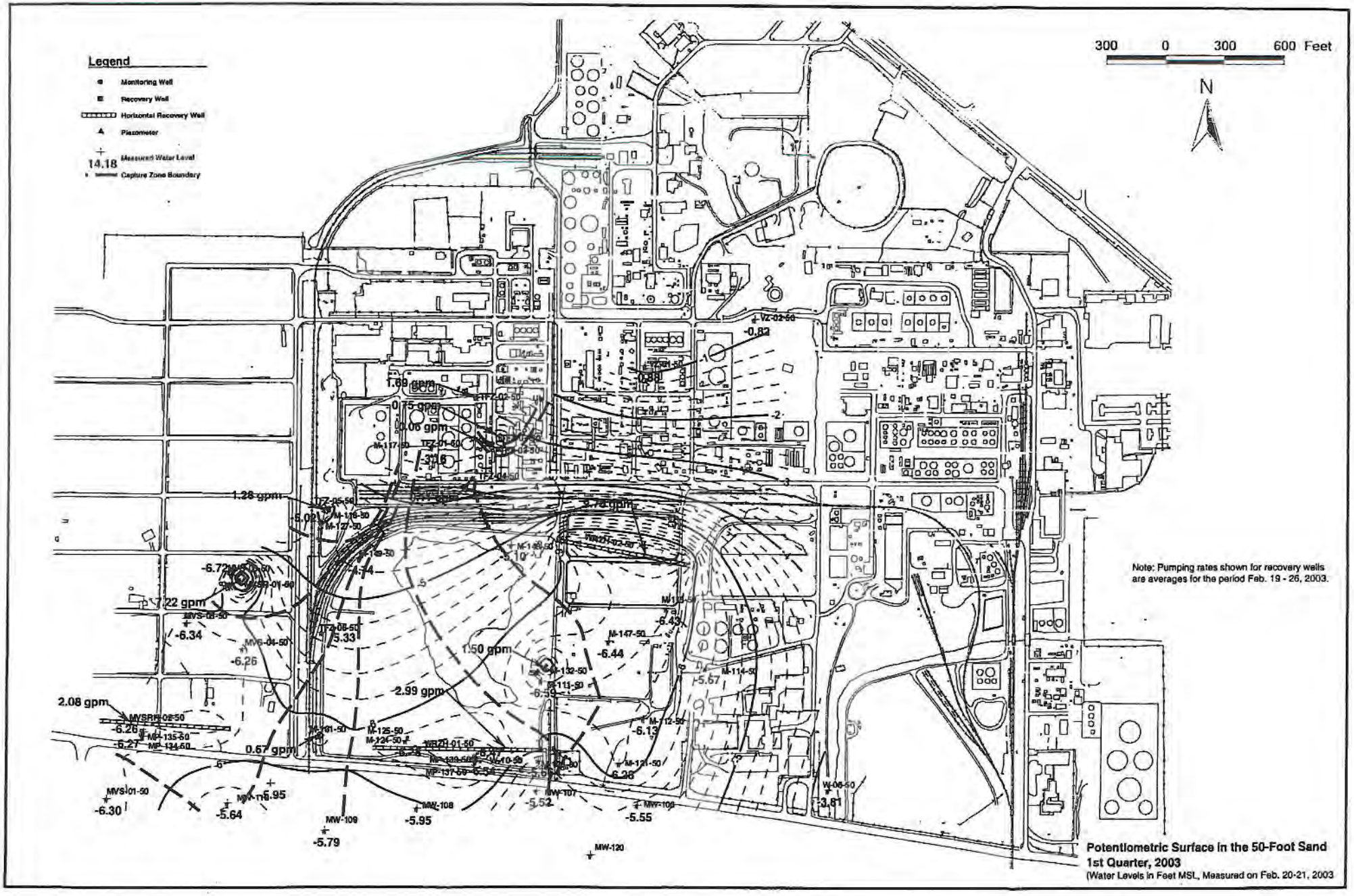


FIGURE 15
TOTAL VOA CONCENTRATIONS IN THE 50-FOOT SAND
SPRING 2001 GROUNDWATER SAMPLING EVENT
Sasol North America, Inc., Lake Charles Chemical Complex

CH2MHILL



Potentiometric Surface in the 50-Foot Sand
1st Quarter, 2003
(Water Levels in Feet MSL, Measured on Feb. 20-21, 2003

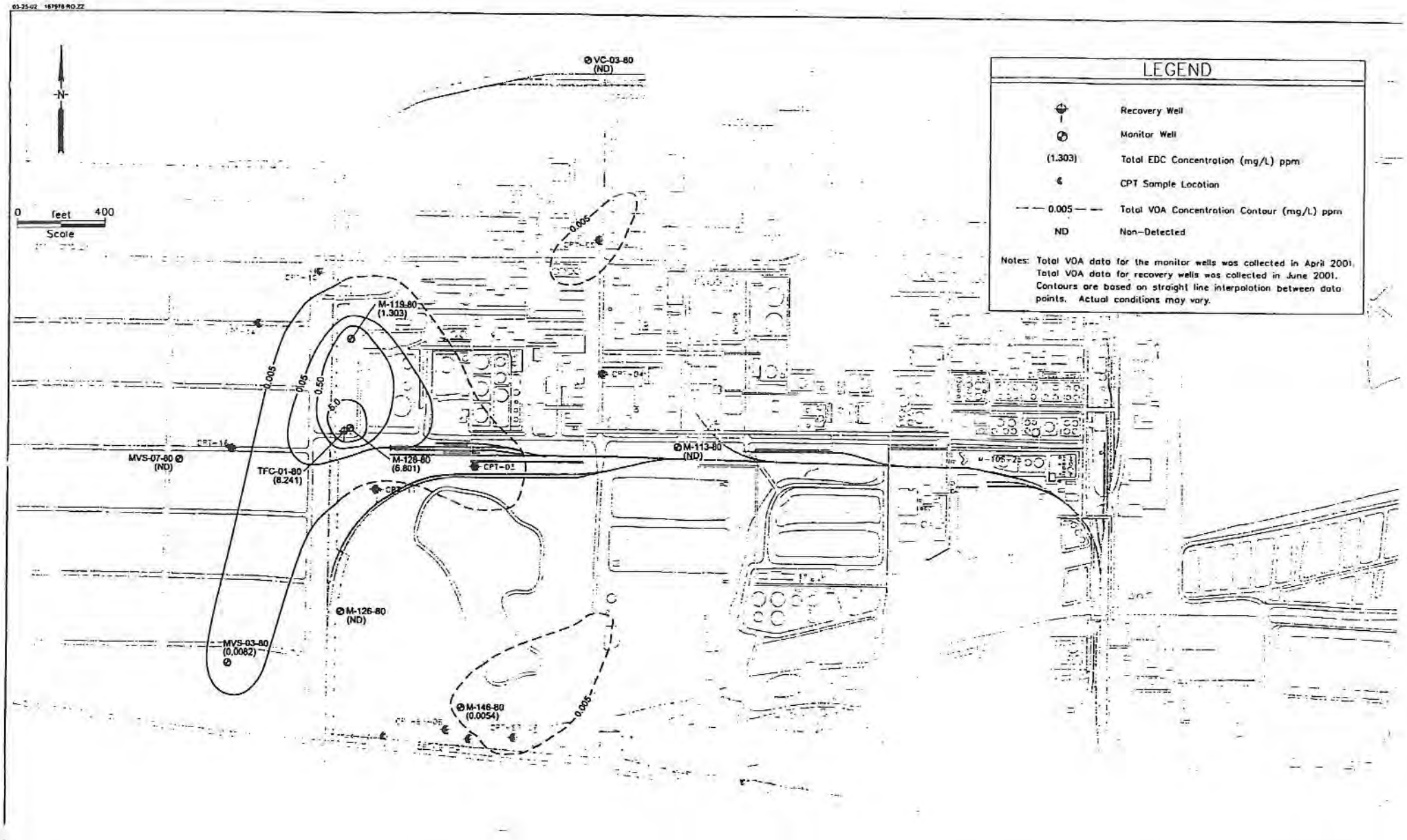
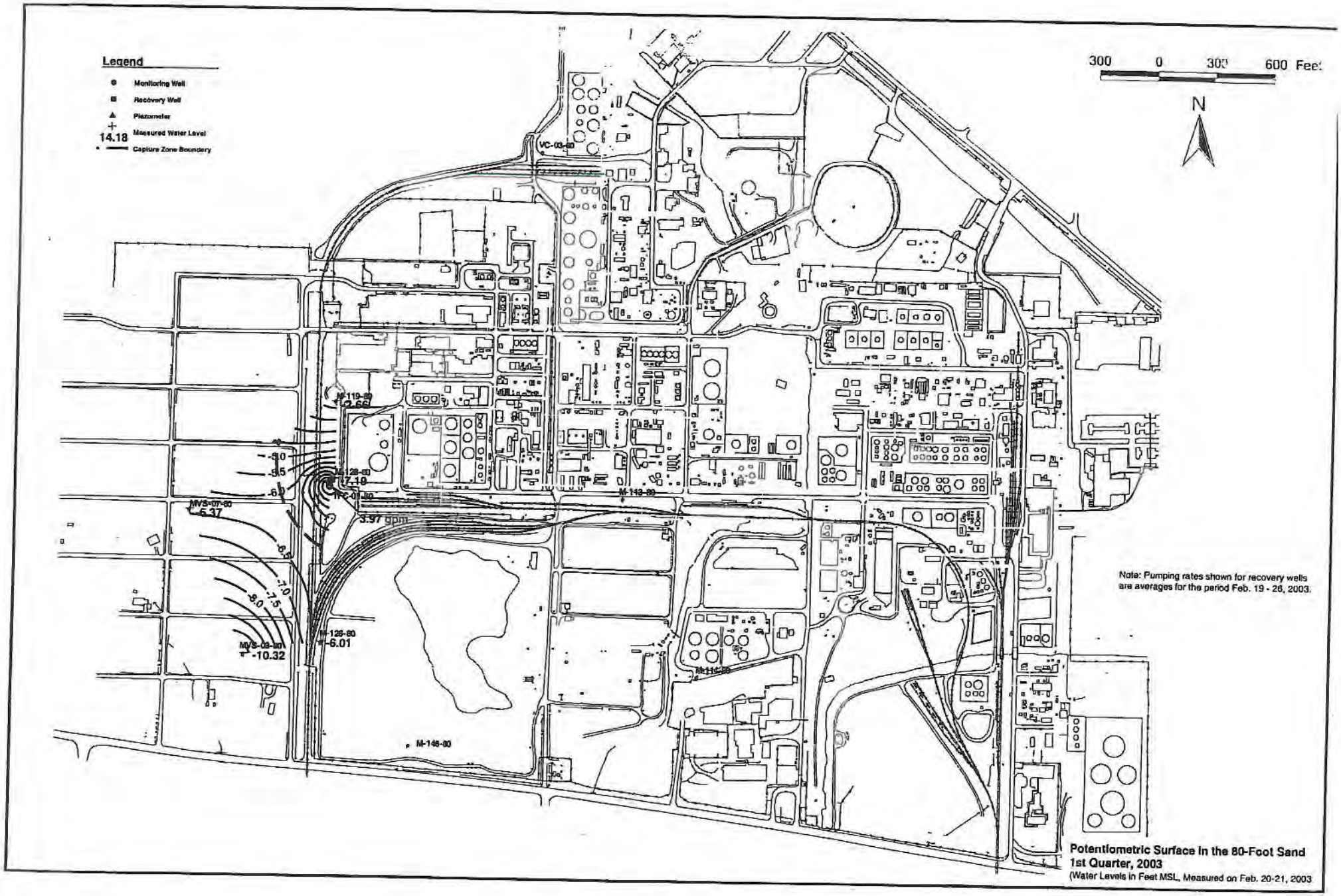
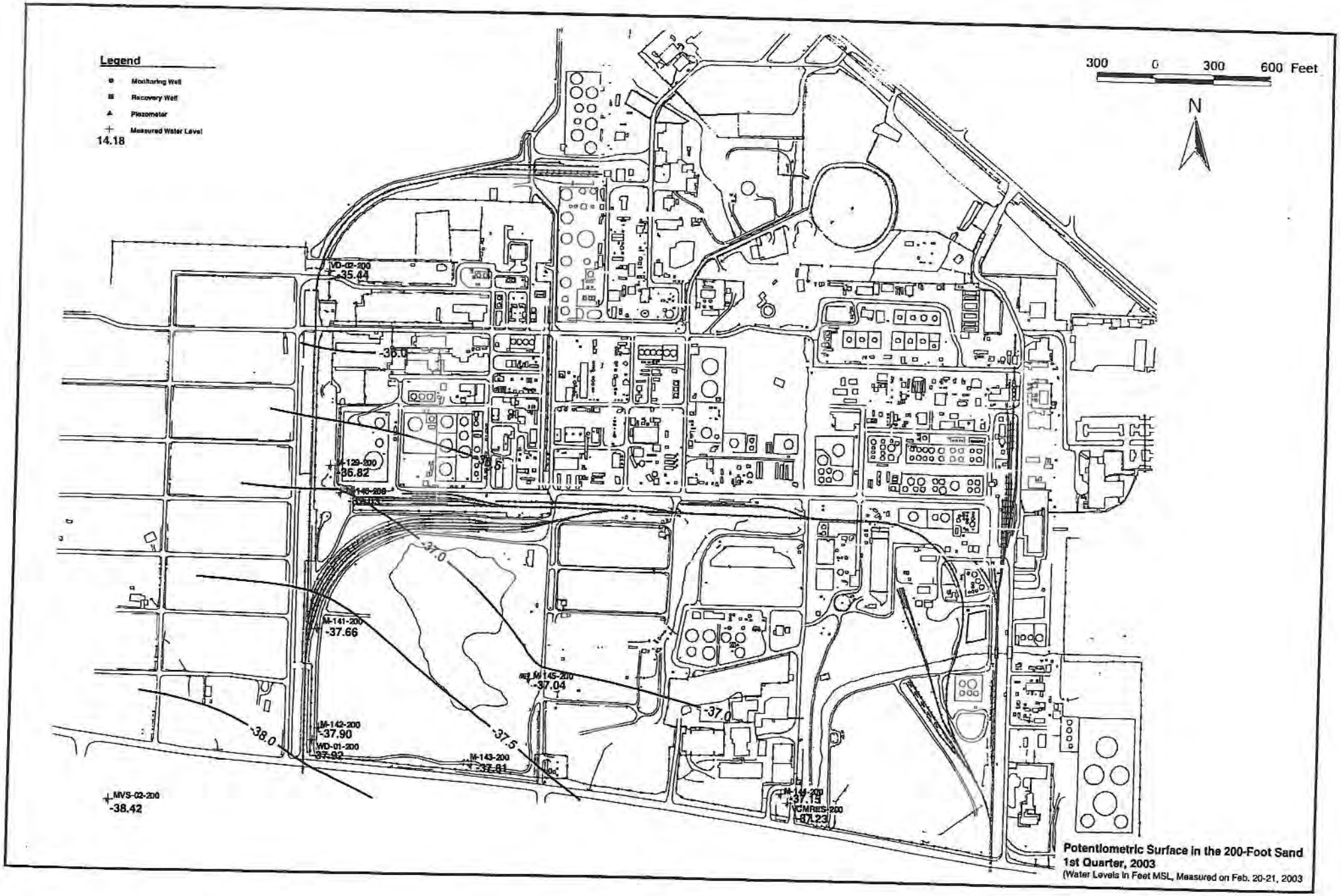


FIGURE 17
TOTAL VOA CONCENTRATIONS IN THE 80-FOOT SAND
SPRING 2001 GROUNDWATER SAMPLING EVENT
Sasol North America, Inc., Lake Charles Chemical Complex

CH2MHILL



Potentiometric Surface in the 80-Foot Sand
1st Quarter, 2003
(Water Levels in Feet MSL, Measured on Feb. 20-21, 2003



Potentiometric Surface in the 200-Foot Sand
1st Quarter, 2003
(Water Levels in Feet MSL, Measured on Feb. 20-21, 2003

Attachment 3

Table 2-1
Historical Reports from the CONDEA Vista LCCC
that Constitute the Primary Geologic Data Repository for the Site
CONDEA Vista Company, LCCC

Document No.	Date	Description
01	1981 to 1986	Well Log and Material Report - Layne, LA
02	January 1982	Transmittal Draft Monitor Well Completion Documentation and Soil Sampling and Analysis - D Appolonia
03	March 1982	Hydrogeologic and Groundwater Quality Assessment, Vinyl Chloride Plant - Geraghty & Miller (G & M)
05	March 1984	Transmittal Monitor Well Completion Documentation - D Appolonia
07	September 1984	Phase I Groundwater Quality Assessment - G & M
	September 1984	Results of Phase I Investigations
	October 1984	Phase I Groundwater Quality Assessment - G & M
11	May 1985	Phase II Groundwater Quality Assessment Summary of Baseline Data - G & M
12	July 1985	Installation of Assessment Monitor Wells and Collection of Baseline Data - G & M
14	November 1985	Aquifer Tests for Evaluation of Groundwater Hydraulic Parameters - G & M
16	November 1985	Phase II Interim Report Installation of Assessment Monitor Wells and Collection of Baseline Data - G & M
17	November 1985	Groundwater Quality Assessment Monitoring Results - G & M
18	February 1986	Responses to Specific Groundwater Contamination Concerns at the LCCP
20	April 1986	Phase II Groundwater Quality Assessment
21	May 1986	Third Quarter Groundwater Quality Assessment Monitoring Results - G & M
25	September 1986	Preliminary Assessment of Potential for Groundwater Contamination from Benzene Spill, LAB Plant, - Schreuder & Assoc.
27	September 1986	VCM Tank Farm Soil and Groundwater Quality Assessment - G & M
28	September 1986	Final VCM/Tank Assessment Report - G & M
29	September 1986	Hydrogeologic Assessment of the 200-Ft Sand - G & M
36	July 1987	Transmittal Boring and Monitor Well Documentation - International Technology Corporation (IT)
38	September 1987	Mossville Subdivision Well Survey and Sampling - IT
40	September 1987	VD-1 - IT
45	September 1988	Impoundment Assessment Report - IT

Table 2-1 (continued) Historical Reports from the CONDEA Vista LCCC that Constitute the Primary Geologic Data Repository for the Site *CONDEA Vista Company, LCCC*		
Document No.	Date	Description
46	March 1989	Phase III Groundwater Quality Assessment Source Determination Report - IT
47	March 1989	Phase III Groundwater Quality Assessment Rate and Extent Report - IT
48	April 1989	Phase III Groundwater Quality Risk Assessment - IT
50	August 1989	Phase III Groundwater Quality Assessment Feasibility Study - IT (final)
51	April 1990	Monitor Well VD-1 Plugging and Abandonment Activities - IT
54	September 1990	Geology of Vista Lake Charles Chemical Complex - IT
55	September 1990	Mossville Subdivision Subsurface Study
56	January 1991	Addendum to the Phase III Groundwater Quality Assessment Rate and Extent Report - IT
57	February 1991	TFZ-7 Recovery Well Installation Report - IT
58	July 1991	Groundwater Remediation Program, 10-Foot and 25-Foot Sand - IT
65.1	August 1992	Chicot Aquifer 200-Ft. Sand Flow Direction - IT
68	January 1994	Monitor Well and Recovery Well Installation Program 1993 - Radian
69	June 1994	Groundwater Remediation Evaluation Plan
84	February 1996	1995 Groundwater Assessment Rate and Extent Report - DuPont

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