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STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
SOUTHEAST MICHIGAN DISTRICT OFFICE

JOHN ENGLER
GOVERNOR

RUSSELL J. HARDING
DIRECTOR

167631

April 28, 2002

Mr. Jason El-Zein
U.S. EPA
9311 Groh Road
Grosse Ile, Michigan 48138

Dear Mr. El-Zein:

SUBJECT: General Oil Site, Northville, Michigan

As we discussed at our meeting on April 9, 2002, the Department of Environmental Quality (DEQ) is nearing the final stages of the implementation of an interim response action for a waste oil release to surface water at the General Oil site The release is located at the west edge of Ford Pond, off Main Street in Northville. Investigative activities conducted at the site have revealed that the waste oil contains PCBs at levels greater than 50 ppm. This waste oil is migrating in the form of free product and has circumvented previous efforts to halt its migration. The PCB levels are significant and considered an acute risk by the MDEQ.

We have completed a Feasibility Assessment along with various stages of investigation and are in the process of developing specifications for a free product capture system along with soil and sediment excavation along the shore of the Pond. The anticipated cost of this effort could be nearly $1,000,000. We are requesting that the EPA enter into a cooperative effort with the DEQ at this site to address this acute problem in a timely manner.

Supporting technical information is attached for you use. Additional details concerning site conditions can be obtained by contacting the State Project Manager, Mr. Steven J. Hoin, at 734-432-1296.

Please contact me at 734-953-1458 when you have determined whether you have sufficient resources to assist the DEQ in this endeavor.

Sincerely,

for Steve Kitler

Steven Kitler, Program Manager
Environmental Response Division

Attachment

cc: Mr. Oladipo Oyinsan, DEQ
Mr. Philip Schrantz, DEQ
Mr. Steven J. Hoin, DEQ

Nov 2-00

Summary - Feasibility Analysis, General Oil Site

The following summarizes the results of a feasibility analysis completed to address the free product at the General Oil Site. The Feasibility Analysis (FA) is considered a limited or shortened analysis. This means that the spectrum of alternatives selected for review was limited to those considered more likely to succeed.

Free Product Removal

Free product is to be removed because it presents an acute risk via migration into a local park and pond. The objective of the FA is to eliminate or significantly decrease the risk associated with the free product.

1) No Action

2) Free Product Recovery

Involves the active removal of product from the formation either via wells or trenches. Product recovery allows for rapid and cost-effective removal, but leaves residual product in place, which may necessitate long-term groundwater recovery. (However, this is an interim action to remove product.) Note: costs include assumed O&M, typically 10 years.

2a) Trench with active product recovery $1,000,000

Pros/Cons – Inexpensive, but would require long term O&M. Models suggest much greater than 10 years to remove product. A single trench likely will not remove all product and installation at plume depth would be difficult and may increase costs. Trench often fail (biofoul) and require replacement.

2b) Trench with Active Product Recovery & Groundwater Removal - $1,500,000

Pros/Cons – See previous, + more aggressive than product recovery only, but cost likely does not justify improved removal rate. Again models suggest very long O&M.

3a) Recovery Wells-Product Only – $1,300,000

Pros/Cons – Allows for flexibility within the plume area (i.e., can easily install new wells), allows for active recovery throughout the plume which is critical because of the complexity of the plume. Models and field tests suggest that recovery with wells will be effective for this plume because of the high aquifer permeability and free product characteristics. Residual will remain in place and likely will impact groundwater.

3b) Recovery Wells-Groundwater and Product – $1,800,000

Pros/Cons – See previous + should increase the recovery rate, but additional cost for handling of water may not be justified. Depression of the water table may become necessary in the event that product only recovery becomes ineffective. Residual will remain in place and likely will impact groundwater.

4) Multiphase Recovery (bioslurping) - $1,900,000

Pros/Cons – Costly, Can be an effective method, but usually most effective within the first few weeks of a release. Likely will "harm" formation around wells and result in increased costs for well installation. Requires combined water/product recovery and separation.

5) In-Situ Stabilization - $4,900,000

Involves the use large augers to mix impacted soils with a bonding or stabilizing agent such as cement or bentonite. Has historically been effective for similar applications.

Pros/Cons – Can effectively remediate product such that residuals will not exist. Costly option, plus cannot address impacted area beneath the railroad track or beneath existing structures on General Oil property.

6) Ex-Situ Incineration - $3,300,000

Involves the excavation of impacted soils and on-site incineration of impacted soils.

Pros/Cons – Can effectively remediate product such that residuals will not exist. Costly, plus may be difficult to permit considering the presence of PCBs in the waste material.

7a) Conventional Excavation - $7,100,000

Involves excavation of impacted soils and disposal at a licensed facility. Assumes 50% of soils require disposal as PCB impacted.

Pros/Cons – Can effectively remediate product. Very costly option, plus cannot address impacted area beneath the railroad track or beneath existing structures on General Oil and Doheny properties.

Pond and Shoreline Restoration

The pond and shoreline present an immediate acute risk and need to be addressed. The objective of this response action is to greatly decrease the immediate risk associated with the free product exposed on the shoreline and entering the pond.

8) Dredging and Excavation, plus Carbon in the Trench - $750,000

Involves dredging the pond area near the release point to remove PCB impacted sediments, plus excavation of heavily impacted soils between the trench and pond, and utilizing the trench as a carbon vessel to address residual product and groundwater migrating past the capture wells.

Pros/Cons – Effectively addresses both impacted soil and sediments. Dredging is costly and the benefit may be limited although restrictions may be needed if dredging does not occur.

9) Excavation, plus carbon in the Trench - $500,000

Involves excavation of heavily impacted soils between the trench and pond, and utilizing the trench as a carbon vessel to address residual product and groundwater migrating past the capture wells. Impacted sediments would not be addressed.

Pros/Cons – Effectively addresses impacted soil. Restrictions may be needed to address impacted sediments.

10) Bioremediation Agent, plus carbon in the Trench - $50,000 to $100,000 (est.)
Involves the application of an additive that enhances the bioremediation of the oil. The material was developed as a result of the Exxon Valdez spill in Alaska. Stuart Oil applied the agent this fall with apparent success although the fate of the PCBs is unknown at this time. Additional applications are required.

Pros/Cons – Would significantly decrease costs because of ease of application and elimination of disposal costs. The effectiveness is uncertain and PCBs may remain. Sediments would not be addressed. Testing and verification would be needed.

Proposed Alternative

The following is the alternative selected jointly between the LOE and the MDEQ. The alternative is a combined alternative involving multiple methods and a phased implementation.

Recovery wells for product only, with excavation between the trench and pond, sediment dredging, and utilization of the trench as a carbon vessel.

Initial capital costs ~ $1,000,000
O&M for 10 years ~ $1,100,000

The recovery wells would be installed in a phased approach, with a system initially installed upgradient of the trench along with pilot wells installed in the north and south plumes. Additional wells and a system would be installed in the north and south plumes, once the recovery rates can be accurately assessed. The system design depends upon the expected rate of recovery for the wells and could involve either independently operated "micro" systems or a larger integrated system. PRPs may claim that they had a better approach and that the MDEQ's approach was too aggressive.

Pros/Cons – Effectively and immediately eliminates the acute risk and addressed the remaining product in a systematic and cost effective manner. Will result in residual product that may be difficult to remove and may require additional wells and follow up. A groundwater problem will remain, but will decrease significantly, as bioremediation should now occur.

Available Funding

Allocated Funds ~ $ 700,000 (available, FY 95, 98)
Appropriated Funds ~ $1,000,000 (FY 00, CRF)

Other Issues

The City of Northville plans to develop the area into a park and has requested that we consider constructing an educational display for the citizens and the City discussing the system.

SITE SUMMARY

Site Name
General Oil Site
(Mergraf Oil Site)
175 Railroad Street
Northville, MI

County: Wayne
MDEQ District: SE Michigan
Site ID#: 820208
MAIN Project#: 451591
Site Score: 43

LOCATION

The General Oil site, an active waste oil recycling operation, is located in a mixed residential and industrial area of Northville Michigan. Two surface water bodies border the site. Lake Success, an inundated former sand and gravel quarry, borders to the northeast; and Ford Pond, which drains into a tributary of the Rouge River, borders to the west. Two groundwater wells are located proximate to the site. One is a production well located at an adjacent business to the east. The other is a public well (to the southwest) operated by the local Rotary Club as an artificial artesian well (the "spring well"). The site consists of three properties, the General Oil property, the Ely Fuel Property (adjacent transport area) to the south and the Doheny Property (part of the former lagoon area) to the north.

SITE HISTORY

A now defunct company conducted oil recycling operations at the site from approximately 1950 through 1970. Unlined earthen lagoons were utilized to store waste oils containing chlorinated solvents, PCBs, and heavy metals. Aerial photographs obtained by Michigan Department of Environmental Quality (MDEQ) personnel have identified five separate lagoons that were constructed at various times during their operation at the site. Four lagoons were located within the property boundaries and one was located east of the property.

The operation was purchased by a second waste oil recycling company in 1971. At the time of sale, reportedly only one of the five lagoons was in operation. All others had been filled and were not evident from the surface. The remaining lagoon was reportedly closed sometime between 1972 and 1974. The present owners of the operation purchased the facility in the early 1980s. A building supply company currently owns the location of the east off-site lagoon.

The tremendous scope of problems at the site was first identified in 1983 when waste oil was observed seeping into Ford Pond. Remedial investigations that were completed in 1990, 1991 and 1992 confirmed that the free phase waste oil is emanating from an old lagoon located approximately 400 feet east of the pond. Investigation activities completed within the General Oil facility boundaries have confirmed that all four on-site lagoons are sources of gross soil and groundwater contamination. Soils proximate to the old lagoons are saturated with waste oils. Groundwater throughout the site is contaminated with chlorinated solvents (known human carcinogens) at concentrations up to eleven hundred times greater than levels protective of human health for drinking water. Free phase waste oils containing chlorinated solvents, PCBs, and heavy metals overlie the water table at three of the former lagoon locations. Free product is entering the nearby Ford Pond and presents an <u>acute</u> hazard. Recent data indicate that the PCBs are present beneath the north lagoons at levels greater than 100 ppm in the product. The interceptor trench for the nearby surface water does not appear to be effective and free product is entering the

surface water. The extent of the contamination fom the lagoon located at the adjacent building supplies company has been characterized. A large free product and dissolved phase plume has been defined. The free product in this area contains PCBs at levels greater than 50 ppm.

SITE STATUS

The property continues to be utilized for waste oil recycling operations by the current owner. A previous owner is operating and maintaining a passive surface water free product recovery system in Ford Pond. Ely Fuel, Inc. completed an investigation of their property and has subsequently sold their property. They removed fuel-impacted soils. The MDEQ is in the process of completing an interim response action at the General Oil site. A Feasibility Assessment has been completed that addresses the free product and impact to the surface waters (Ford Pond). A final design is anticipated for spring of 2002 with construction to follow shortly afterwards.

ENFORCEMENT STATUS

The change in liability standards contained in the Part 201 amendments of 1995 has created uncertainty concerning whether any past or present owners or operators of the site can be demonstrated as liable for the contamination. A Fact Sheet has been drafted and a liability conference has been completed. It appears likely that at least on one past owner/operator will be found liable for a fraction of the contamination problem. Other parties may be liable and a liability investigation is on-going. Enforcement activities are planned following further investigation.

RESPONSE ACCOMPLISHMENTS **EXPENDITURES**

Phase I - REMEDIAL INVESTIGATION **$173,915**

Funds were used in 1998 to complete a site investigation to further characterize the level of impact to groundwater and surface water. The results indicated significant impact to both receptors.

Phase II - REMEDIAL INVESTIGATION **$89,899**

Additional RI activities have been conducted to further characterize the impact to the local groundwater aquifer (the Spring Well) and surface water and to further defined the extent of free product. The recent data indicate that vinyl chloride has reached the area of the Spring Well at levels equivalent to the drinking water criteria, however the well screen appears to be isolated from the zone of impact. VOCs have not been detected in any of the quarterly samples collected from the Spring Well. The Vinyl chloride has reached beyond Doheny drive to the south, but at low levels (below 10 ppb).

INTERIM RESPONSE – non MDEQ **private funds -- unknown**

Limited Interim response measures have been completed at the site. One past and one present owner/operator of the site have funded the maintenance of a floating boom system at Ford Pond since 1991 in an attempt to collect infiltrating free product. A skimmer trench, designed to capture waste oils before they reach Ford Pond, was constructed in February of 1994 and is regularly maintained. Oil recovery activities were expanded in 1995 by the addition of an active product recovery well located upgradient of the oil seep at Ford Pond.

This active system has subsequently been shut down because it was ineffective. Oil recovery activities continue at the time of this summary.

INTERIM RESPONSE – Drum Removal **$50, 200**

A drum removal action was completed to remove drums detected at the site during construction of footings for a building. Approximately 10 drums containing various oils and hydraulic fluids were discovered and removed. In addition approximately 500 cubic yards of product saturated soils was also removed.

FEASIBLITY ASSESSMENT-PRELIMINARY DESIGN **$123,484**

A free product removal FA was completed. The selected alternative as a result of that FA was free product removal from both plumes via active capture. The FA resulting indicated that contaminated soils along the shore of Ford pond are best handling via excavation and that dredging was the most effective alternative to address the impacted sediments within the pond. A conceptual design was drafted based upon the FA results.

DESIGN-SPECIFICATIONS-BID **$237,180**

The design build process is in process as of the date of this summary. A 60% design has been completed and the permitting process has been initiated. The design includes a barrier wall/sump free product collection system adjacent to Ford Pond. Also includedare dredging and soil removal and removal of the existing trench. The costs include activities such as oversight of the bid process and contractor oversight during construction.

LIABLE PARTY INVESTIGATION **$50,000**

A PRP investigation is in process utilizing an independent contractor. That investigation should be completed by mid-2002.

FUTURE RESPONSE NEEDS **PROJECTED COST**

Private remedial activities, other than the operations and maintenance activities discussed above, have ceased. Contamination is anticipated to continue to spread into presenty unimpacted areas of the aquifer. Free product and related contamination will continue to flow into Ford Pond unless halted.

INTERIM RESPONSE-Ford Pond **$1,000,000**

The FA has been completed and reviewed by the FOQRT. The selected remedy includes:

1) Installation of free product recovery wells with active removal via pumps along Ford Pond.
2) The excavation and dredging of the impacted soils and sediments downgradient of the trench at the pond.

Note: This Interim Action does not include any free product recovery from the lagoons in the source area.

INTERIM RESPONSE-Lagoon Area **$500,000**

The most recent design activities address only the immediate risk associated with the free product that is entering Ford Pond. The free product known to be present in the source area is to be addressed following an evaluation of the risk associated with the groundwater pathway. It is anticipated that a removal system incorporating independently operated wells will be effective.

REMEDIAL ACTION-Groundwater **~$1,500,000**

The interim response action does not address groundwater contamination. A larger more extensive remediation system may be necessary to address groundwater impact, depending upon the site risk. This more extensive remedial alternative will be evaluated following the completion of the interim response action and the evaluation of the additional investigation data. The recent investigation results indicate that the environmental impact at the site is significant. The PCBs present an acute risk and are impacting the nearby surface water. The potential exists that groundwater, which is utilized by the community, may become impacted. The costs to remediate the groundwater have not been accounted for in any of the previous analysis. Additional costs will be incurred if groundwater remediation becomes necessary. The additional investigation activities indicate that the Spring Well is not yet impacted, however further impact is possible. The estimated cost for this action will likely be greater than $1,000,000.

The remedial action (RA) for groundwater will likely include capture wells in downgradient areas, particularly near the Northville Spring well along with a treatment system. O&M costs could be significant because of the possible extended operation time required.

LONG TERM O&M – Free Product **$500,000**

Additional funding will be needed for long term operations and maintenance of the free product recovery system. Recent design information suggests costs of about $500,000 for 10 years of operation.

LONG TERM O&M – Groundwater **$1,000,000**

Additional funding may be needed for long term operations and maintenance of a groundwater capture and treatment system. The necessity for such a system is being evaluated. In the event that groundwater remediation is needed, the O&M costs would increase significantly. Additional costs could exceed $1,000,000.

SPECIAL CONSIDERATIONS

The focus of the proposed actions has changed since the project inception. The initial $680,000 in funding was allocated primarily to ensure that free product removal activities were carried out. Because of the change in liability status, (see Enforcement Status) the focus is now on eliminating the risk associated with the site such that, at a minimum, an approved partial closure is achieved. In order to achieve an approved partial closure it will be necessary move directly into site remediation (i.e., the interim response action). This approach is also considered to be more cost effective and protective of human health and the environment.

FUNDING HISTORY

General Fund Authorizations			Bond/CMI Fund Appropriations						
YEAR	ACTION	AMOUNT	YEAR	ACTION	AMOUNT	ACTION	AMOUNT	ACTION	AMOUNT
1997	IR	$100,000	1995	IR	$750,000	transfer	($70000)		
1998	RI	$150,000	1998	RI	$150,000				
1995	IR	$623,910	1998	IR	$320,000				
1998	IR	$321,370	2000	RS	$1,000,000				
			2002	OM	$150,000				

FY01 PROPOSED ACTION

The 1995 and 1998 IR and the 2000 RS funds will be utilized to design and construct the interim response action. 2002 funds will be used to operate the interim response system for the first few years. Additional funds will be needed for groundwater treatment (if necessary) and long term Operations and Maintenance.

Available Funding		
Funds Authorized (FY95,98,00,02)	$1,119,200	
Funds Encumbered (or closed)	$ 724,678	
Authorization Balance		$ 394,522
Allocations Available		$1,150,000 (incl. $150,000O&M)
	Total Available	$1,544,522
Estimated Known Funding Needs		
Funds needed IRA-Free Product	$1,500,000	
Funds needed for Short Term O&M	$ 150,000 (free product Ford Pond- 3 yrs)	
Funds needed for Long Term O&M	$ 350,000 (free product recovery – 10yrs)	
	Total Needed	$2,000,000
Present Funding Shortfall	less Available	**$ 455,478**
Estimated Potential Funding Needs		
Groundwater Treatment Costs	$1,500,000 (est.)	
Groundwater O&M Costs	$1,000,000 (est.)	
Total Groundwater Remediation Costs		**$2,500,000** (est.)

Note As of October 1995, the cleanup program responsibilities were transferred from the Michigan Department of Natural Resources (MDNR) to the Michigan Department of Environmental Quality (MDEQ). As of April 1996, the functions performed by the Michigan Department of Public Health (MDPH) for water supplies were transferred to the Drinking Water and Radiological Protection Division (DWRPD) of the MDEQ

DLZ
ENGINEERS • ARCHITECTS • SCIENTISTS
PLANNERS • SURVEYORS

November 16, 2000

Mr. Steven Hoin
Michigan Department of Environmental Quality
Environmental Response Division
Southeast Michigan District
38980 West Seven Mile Road
Livonia, MI 48152

RE: Product Recovery Demonstration Program – Summary Report
Mergraf Oil (General Oil) Site – Northville, Michigan
MERA ID No. 820208
DLZ Project No.: 9441-4848-39

Dear Mr. Hoin:

At the request of the Michigan Department of Environmental Quality (MDEQ), DLZ Michigan, Inc. conducted a Product Recovery Demonstration Program (PRDP) Pilot Study during the period of September 19 – 25, 2000. The objective of the PRDP Pilot Study was to assess to feasibility of free product recovery at the site. In order to complete the objective, DLZ gathered preliminary data from selected existing site monitoring wells and performed a PRDP Pilot Study.

This letter report provides a brief description of work performed and summarizes the findings of the PRDP Pilot Study.

PRELIMINARY ACTIVITIES

DLZ conducted bail-down tests on monitor wells ELY-MW-5 and MW-7. These wells were selected based on their location within the free product plumes and historical product thickness measurements. Prior to performance of the bail-down tests, DLZ collected baseline field data, which included fluid-level measurements (depth to groundwater and LNAPL thickness) in each well.

The bail-down test entailed bailing each well of most of the free product present using dedicated disposable bailer(s). A free product interface probe was then used to measure the LNAPL recovery rates at select time intervals. The tests were terminated when the LNAPL thickness in the wells recovered to equilibrium thickness. Free-product recovery test data are presented in Appendix A. The plots of LNAPL thickness versus time are presented in Appendix B. The results are summarized as follows:

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- After approximately 21 minutes of product removal at ELY-MW-5, free product thickness dropped from 8.16 inches to 3 inches. At the end of the recovery test (30 minutes), the water level in the well rose from 13.34 feet to 12.78 feet below grade, and free product thickness in the well remained unchanged (3 inches). The factors, which may be effecting product recovery may include the following;

  - The well screen may be coated with bacterial slime, as evident during bailing activities.
  - The pre-bailing product thickness (8.16 inches) could be stagnant free product buildup.
  - The well screen may not be set to exactly bisect the free product zone.

- After approximately 12 minutes of bailing at MW-7, the free product was removed to a sheen. DLZ then monitored the product/water (P/W) interface at select time intervals. For a period of 6 minutes, the interface probe measured infiltration of groundwater into the well depicted by rise in water levels, and when the water level reached equilibrium conditions, product started flowing into the well. Static product recovery rates in the well were relatively slow (approximately 75 minutes for full recovery). This factor could be attributed to the well screen coated with bacterial slime, as evident during bailing activities.

PRDP PILOT STUDY

DLZ participated in XITECH® Instruments PRDP Pilot Test by utilizing the ADJ product recovery skimmer for a period of two-weeks. The PDRP Pilot Test was performed on four select monitoring wells (ELY-MW-4, ELY-MW-5, MW-7 and SEG-MW-3). These wells were selected based on their location within the free product plumes and historical product thickness measurements.

A XITECH® sales representative was present on September 19, 2000 at the time of installation in MW-7 to ensure proper installation and provide operational training of the recovery system. XITECH® provided one 2-inch ADJ Smart Skimmer, one ES Timer with high level tank shutoff sensor assembly, well cap, all necessary tubing for air supply and product discharge, safety rope for skimmer, air supply regulator, and a operational manual. DLZ provided compressed air supply, DC power, 55-gallon drum, and a technician for installing the system.

On September 22, 2000, DLZ collected fluid-level measurements in monitor wells SEG-SW-3 and SEG-SW-5, located near the leading edge of the North product plume near the trench by Ford Pond. SEG-MW-3 located near the pond had 7.92 inches of measurable product. Monitor well SEG-SW-5 located immediately up-gradient from the trench had 3.24 inches of measurable product. Since this would be the most likely location for an Interim Response Free Product Recovery System to abate the acute hazard (product impacts to Ford Pond), DLZ selected SEG-SW-3 with 7.92 inches of measurable product as a product recovery pilot test well in the north plume.

Summaries of findings of the PRDP pilot study conducted by DLZ are as follows:

- Product recovery tests in MW-7 (2-inch well), ELY-MW-4 (4-inch well) and ELY-MW-5 (4-inch well) utilizing the 2-inch XITECH® skimmer were unsatisfactory due to poor static product recovery. These wells have not been monitored or developed for three years, and probably plugging of the well screens due to biological fouling could have resulted in these wells being poor producers. In addition, the well screens may not be set to exactly bisect the free product zones.

- On September 22, 2000 an 2-inch XITECH® ADJ skimmer was installed in SEG-SW-3 (2-inch well) and air supply to skimmer started. The air flow was initially set at 60 pounds per square inch (PSI), and since the flow rate was sluggish, the pump was lowered an additional 2 inches and the air flow increased to 70 PSI. The timer was set to pump 5 minutes every hour. In 24 hours, about 2.5 gallons of product had collected in the drum. This amounted to pumping 2.5 gallons in 2 hours. Increasing the discharge time and decreasing the refill time would have resulted in increased output. On September 23, 2000 a DLZ technician observed significant product between Ford Pond and the first boom. The Ford Pond continues to be impacted with product discharge.

CONCLUSIONS AND RECOMMENDATIONS

- Preliminary test data from the PRDP pilot study conducted on wells MW-7, ELY-MW-4 and ELY-MW-5 indicated poor response to pumping which could be due to biological fouling, and the well screens may not be set to exactly bisect the free product zones. However, the shallow well SEG-SW-3 near Ford Pond responded well to pumping. The test revealed that SEG-SW-3 is properly constructed and is capable of producing product during the refill time which is an ideal pumping condition.

- Pilot test data indicates product recovery is feasible near Ford Pond. The 2-inch XITECH® skimmer was capable of pumping 2.5 gallons of product in two hours of pumping time from well SEG-SW-3.

- Based on the pilot test, DLZ recommends initiating an Interim Response Product Recovery System immediately up-gradient from the trench by utilizing XITECH® skimmers. In addition, product-impacted soil between the Trench and Ford Pond could be remediated either by excavation for off-site disposal or utilize an in-situ biological treatment technology.

    - Since a 4-inch recovery well would yield four times more product than a 2-inch well, DLZ recommends placing eight 4-inch product recovery wells up-gradient from the trench. Implementing the product recovery system will prevent future product discharge into Ford Pond. A recovery system consisting of 4-inch XITECH® skimmers would pump product from the recovery wells into a product tank. The product tank could be emptied periodically by a licensed waste-hauler for transportation and recycling. DLZ upon MDEQ authorization will develop Contract Specifications, assist in Bidding, and recommend a Trade Contractor to implement the Interim Response Product Recovery System.

- DLZ recommends installing two (2) 4-inch product test wells one each in the north and south plume. The proposed wells will be constructed such that the screens will straddle the respective product zones, and the wells will be good producers. The proposed product-test wells will be used to conduct a PRDP pilot study to determine the effectiveness of the XITECH® skimmer in both the north and south plume in the proximity of General Oil and Doheny properties respectively.

Should you have any questions or need additional information, please do not hesitate to contact the undersigned.

Very truly yours,

DLZ MICHIGAN, INC.

B.K. Gopal
Project Engineer

Scott Cesarz
Project Manager

BKG/SAC/has

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APPENDIX A

Free-Product Recovery Test Data

FREE-PRODUCT RECOVERY TEST

LOCATION: General Oil Site (Mergraf Oil)
175 Railroad St.
Northville, Michigan

PERSONNEL PRESENT: BK Gopal, John Greene & Mohamed Zakkar

DATE: September 1, 2000

DLZ JOB NO.: 9441-4848-39

METHOD: Disposable bailer, bailed well until most of product out of well (<0.25").
Then measured product thickness at selected time intervals.

WELL: ELY-MW-5 WELL DIAM. = 4"

Time	Cumulative Time (min)	Product Thickness (feet)	Depth to Product (feet)	Depth to Water (feet)	Comments
15.02	0	0.68	10.65	11.33	Before Bailing
15.09	7	NM	NM	NM	Start Bailing
15.22	20	NM	NM	NM	End Bailing
15.23	21	0.24	13.1	13.34	
15.24	22	0.28	13.02	13.3	
15.25	23	0.25	12.97	13.22	
15.26	24	0.25	12.92	13.17	
15.27	25	0.28	12.89	13.17	
15.32	30	0.27	12.79	13.06	
15.37	35	0.32	12.69	13.01	
15.42	40	0.3	12.62	12.92	
15.47	45	0.28	12.56	12.84	
15.52	50	0.27	12.51	12.78	End Test

NM = Not Measured
NOTE: General Oil Gates locked at 4:00 PM, and had to end test at this time.

FREE-PRODUCT RECOVERY TEST

LOCATION: General Oil Site (Mergraf Oil)
175 Railroad St.
Northville, Michigan

PERSONNEL PRESENT: John Greene & Mohamed Zakkar

DATE: September 1, 2000

DLZ JOB NO.: 9441-4848-39

METHOD: Disposable bailer, bailed well until most of product out of well (0.0").
Then measured product thickness every five minutes.

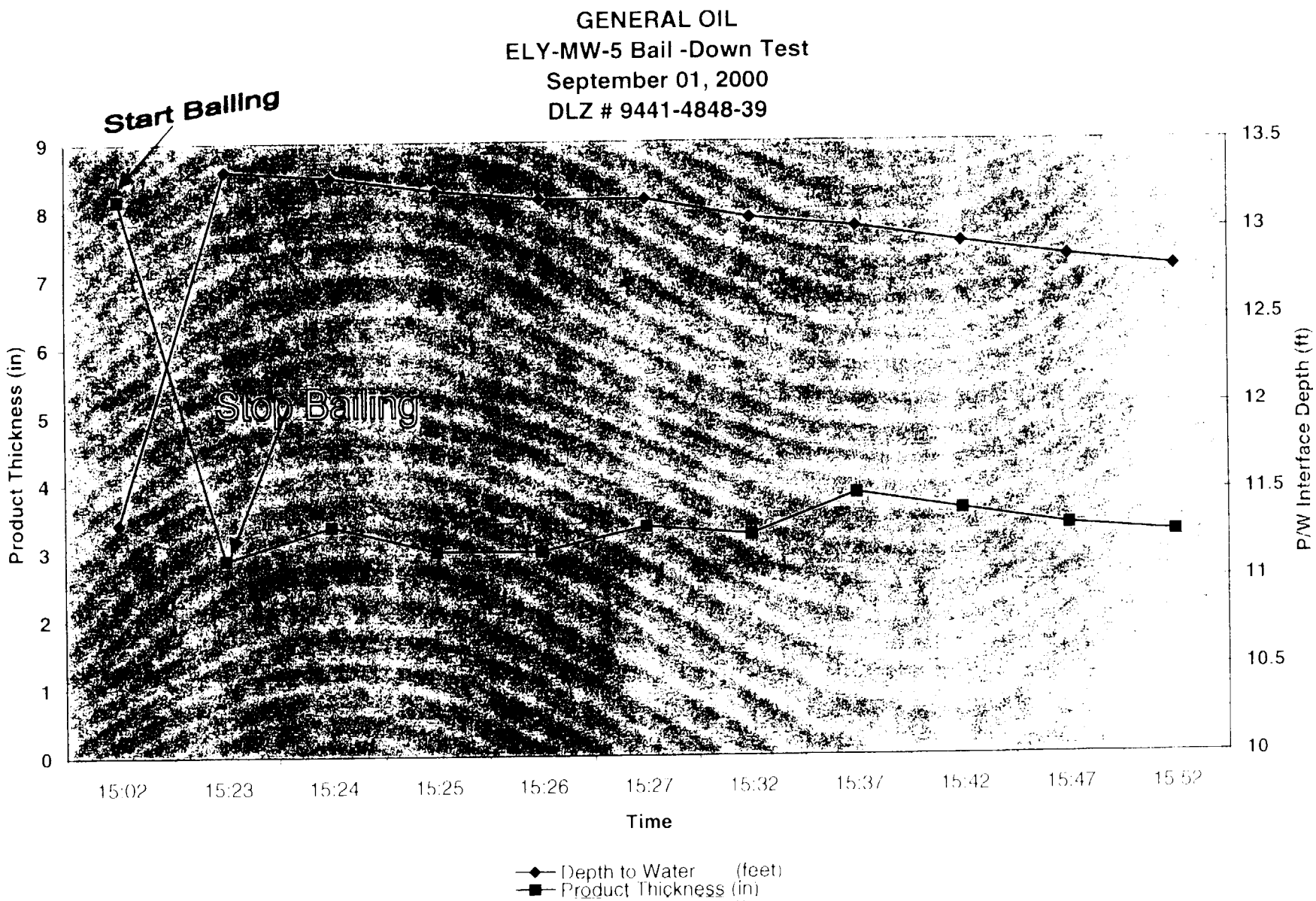
WELL: MW-7 WELL DIAM. = 2"

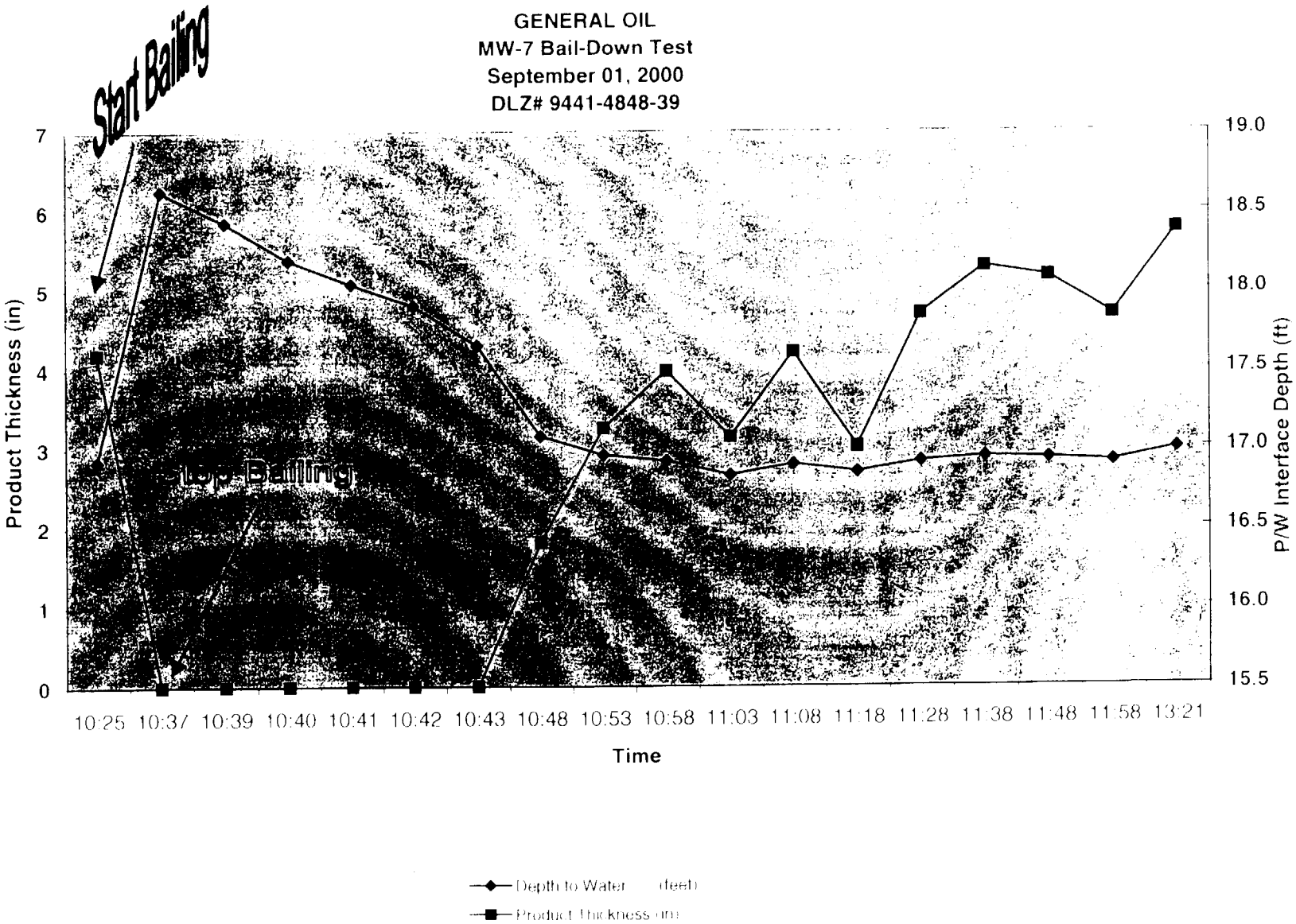
Time	Cumulative Time (min)	Product Thickness (feet)	Depth to Water (feet)	Depth to Product (feet)	Comments
10:25	0	0.35	16.92	16.57	Before Bailing
10:28	3	NM	NM	NM	Start Bailing
10:37	12	0.00	18.63	0.00	End Bailing
10:39	14	0.00	18.43	18.43	
10:40	15	0.00	18.19	18.19	
10:41	16	0.00	18.04	18.04	
10:42	17	0.00	17.90	17.90	
10:43	18	0.00	17.65	17.65	
10:48	23	0.15	17.07	16.92	
10:53	28	0.27	16.95	16.68	
10:58	33	0.33	16.91	16.58	
11:03	38	0.26	16.82	16.56	
11:08	43	0.35	16.89	16.54	
11:18	53	0.25	16.84	16.59	
11.28	63	0.39	16.91	16.52	
11.38	73	0.44	16.94	16.50	
11.48	83	0.43	16.93	16.50	
11.58	93	0.39	16.91	16.52	
13.21	176	0.48	16.99	16.51	End Test

NM = Not Measured

APPENDIX B

Plots of LNAPL Thickness and Product/Water Interface Depth Versus Time


GENERAL OIL
ELY-MW-5 Bail -Down Test
September 01, 2000
DLZ # 9441-4848-39
Start Bailing
Stop Bailing
Product Thickness (in)
P/W Interface Depth (ft)
Time
0
1
2
3
4
5
6
7
8
9
10
10.5
11
11.5
12
12.5
13
13.5
15:02
15:23
15:24
15:25
15:26
15:27
15:32
15:37
15:42
15:47
15:52
Depth to Water (feet)
Product Thickness (in)


GENERAL OIL
MW-7 Bail-Down Test
September 01, 2000
DLZ# 9441-4848-39
Start Bailing
Stop Bailing
Product Thickness (in)
P/W Interface Depth (ft)
Time
0
1
2
3
4
5
6
7
15.5
16.0
16.5
17.0
17.5
18.0
18.5
19.0
10:25
10:37
10:39
10:40
10:41
10:42
10:43
10:48
10:53
10:58
11:03
11:08
11:18
11:28
11:38
11:48
11:58
13:21
Depth to Water (feet)
Product Thickness (in)