A Recycling Exemption for Oil/Water Separator Wastes at a Large Military Base in California

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ABSTRACT

The Health & Safety Code (HSC) in California contains provisions that can exempt a recyclable material from categorization as a hazardous waste if certain strict criteria are met. The Department of Toxic Substances Control (DTSC) is wary of "sham" recycling and requires substantial proof of beneficial reuse for a facility to qualify for this exemption under HSC 25143.2.

A large military installation in California generated 7.9 million pounds of oil/water separator (OWS) waste in 1998. Because the OWS waste contains oily components and was presumed to fail the aquatic toxicity test, the installation recategorized the OWS waste from nonhazardous to a California hazardous waste. This change in categorization resulted in a large increase in disposal costs and volumes for the facility. In 1999, the installation began contracting the onsite recycling of the waste using a mobile gravity separation unit in an effort to control disposal costs.

In 1999, CH2M HILL evaluated the onsite recycling process as part of the Senate Bill (SB)-14 report/plan and suggested that the recycled water had a beneficial reuse in California because of the arid climate. It was shown that 87 percent of the OWS waste could be regenerated as clean water with 0.8 percent sent offsite as oil for recycling. Only 1.5 percent was determined to be a hazardous waste residue from the recycling process. The other 11 percent was sediment that was dried and applied to the onsite

landfill as a daily cover. All of these activities meet the HSC criteria and, as a result, the installation appears to qualify for the recycling exemption.

The overall results for the installation have been a drastic reduction in hazardous waste quantities and a beneficial reuse of water. For the next SB-14 reporting cycle, these waste minimization results could be truly impressive.

INTRODUCTION

CH2M HILL evaluated the hazardous wastes that were generated at a large military installation during calendar year (CY) 1998 and the pollution prevention (P2) measures as part of the compliance of the installation with California's Hazardous Waste Source Reduction and Management Review Act. (This is commonly referred to as Senate Bill 14 or SB-14 in California.) The installation already has a mature program in place for waste minimization that is being implemented by the Assistant Chief of Staff (AC/S) Environmental Security (ES) and the P2 & Hazardous Waste Minimization Branch. Many of the "low hanging fruit" had already been identified in previous studies and a large number of P2 options were being implemented. The purpose of CH2M HILL's study was to perform a regulatory analysis of the largest waste stream at the installation and demonstrate that the water being recycled qualified for an exemption under the health and safety code (HSC) 25143.2(d)(6). The Department of Toxic Substances Control (DTSC) is wary of "sham" recycling and requires substantial proof of beneficial reuse for a facility to qualify for this exemption under the HSC. CH2M HILL was able to identify and assemble appropriate data to support this exemption.

The installation is currently recycling its oil/water separator (OWS) waste and appears to qualify for an exemption from categorization as a hazardous waste under the HSC 25143.2(d)(6). It is essential for the installation to know the correct regulatory status of the OWS waste for the following reasons:

- To correctly calculate and report the amount of hazardous waste generated each year
- To accurately complete the summary progress report projections required under Senate Bill (SB)-14 for subsequent reporting years

Regulatory Precedent

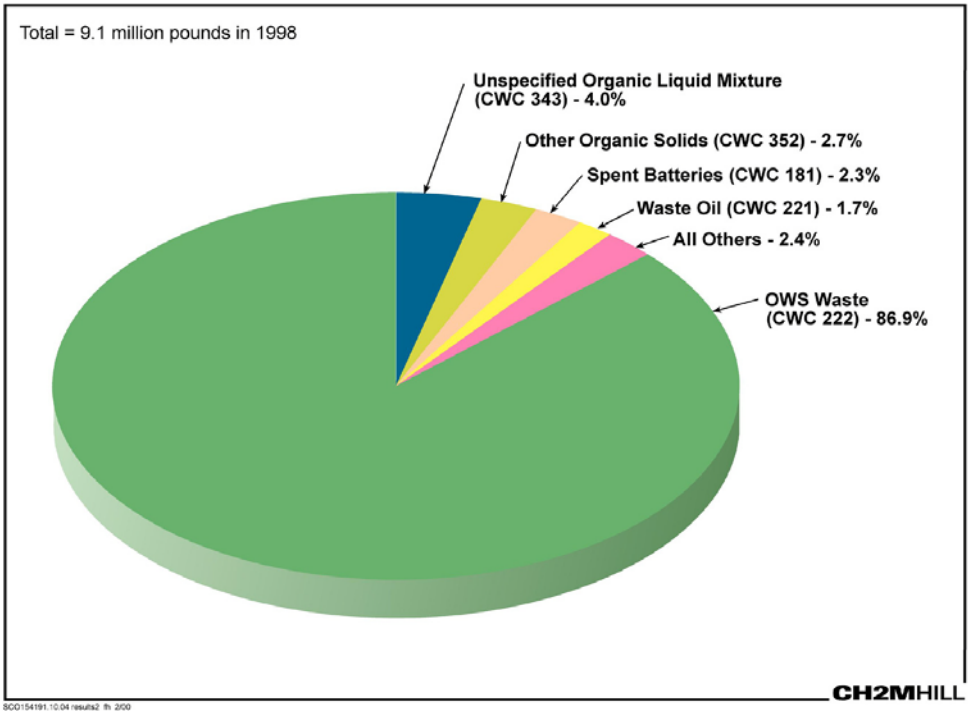
California Environmental Protection Agency, Department of Toxic Substances Control, Resource Recovery Section issued guidance in December 1992 to clarify the recycling provisions of HSC 25143.2 and how they relate to the tiered permitting provisions. In recent years, DTSC has responded to requests from industry to confirm the applicability of the recycling exemptions at: Lockheed Martin Skunk Works (1999),[1] Deutsch ECD (1996),[2] Applied Micro Circuits Corporation (2000),[3] and Blue Spring Water Recycling Systems (1998).[4] DTSC has not established a specific minimum percentage of recovered water to be reused onsite for facilities to qualify for the HSC exemption. However, DTSC states that "Clearly, the larger the percentage of material recycled onsite, the more

certain the recycling activity will be viewed as legitimate." These letters demonstrate that there are several recent precedents where DTSC has granted the HSC exemption for water recycling activities.

BACKGROUND

The installation generated 7,904,294 pounds of OWS waste in 1998. This was the largest waste stream generated at the facility, comprising 86.9 percent of the total hazardous waste generated on a routine basis. (See Figure 1.) The OWS waste is generated when vehicles and tactical equipment are hosed down using washracks at the installation. The washwater is captured by the OWS, where solids settle to the bottom and oil floats to the top. Clean water is discharged from the OWS to the sewer system of the facility, which connects to one of several pretreatment plants. Previous studies had demonstrated that the influent to the OWSs was nonhazardous according to Title 22 of the California Code of Regulations.[5]

Figure 1: Routinely Generated Hazardous Wastes at MCB Camp Pendleton



In 1998, the sediment and oily waters were removed on a periodic basis from each OWS and disposed as hazardous wastes with California Waste Codes (CWCs) 222 and 223. In August 1999, the installation established a turnkey contract with Enviremedial Services, Inc. (ESI) to reduce disposal costs and recycle the OWS waste onsite with a mobile recycling unit.

PROJECT DISCUSSION

Recycling/Recovery Process

The installation generates three distinct waste streams in its OWSs:

- Used oil
- Dirty water
- OWS sediment

The three waste streams are present in every OWS and clearly distinguishable from each other by their physical/chemical properties and location in the interior of the OWS. The used oil floats on top of the aqueous phase and is physically separated from the dirty water by the oil/water interface. The sediment resides at the bottom of the OWS in the first compartment and is the heaviest waste stream due to the presence of solids. The dirty water resides in the second compartment below the used oil. It is separated from the used oil by the oil/water interface.

ESI manages each of the three waste streams separately because of their different chemical and physical properties:

1. ESI skims the used oil off the top of the OWS, drums it, and gives it to AC/S ES who manages it according to HSC 25250.1(e) and 25143.2(d)(2)(D). The used oil is managed as a non-Resource Conservation and Recovery Act (RCRA) hazardous waste.

2. The sediment is removed from the OWS and dewatered to produce a nonhazardous landfill cover for disposal at the onsite landfill. ESI applies no heat to dry the sediments, only a filter press.

3. The dirty water undergoes gravity and physical separation to remove residual oil to generate clean water and used oil. The clean water is put back into the OWS and is necessary for the OWS to operate properly. A small amount of oil is recovered from this step and recombined with the used oil in Step 1.

ESI adheres to the following procedures[6]:

1. Remove oil from the OWS and put it into containers for offsite recycling.

2. Pump out oily water and remove total petroleum hydrocarbons (TPHs) and suspended solids by gravity separation.

3. Remove sediment from the OWS and dry it to a moisture content of less than 10 percent using a filter press.

4. Sediments with a TPH content less than 2,000 parts per million (ppm) are disposed at the onsite landfill as a nonhazardous waste.

5. Sediments with a TPH content of 2,000 ppm or greater are put into containers for offsite disposal as a non-RCRA hazardous waste.

6. Return clean water to the OWS so that it is filled to least 80 percent capacity.

The results of the recycling activities during the period from February 2001 through October 2001 are as follows:

- 86.7 percent was water that was cleaned and returned to the OWSs.

- 11.0 percent was sediment that was cleaned and disposed at the onsite landfill as a nonhazardous waste.

- 0.8 percent was oil that was recovered and recycled offsite.

- 1.5 percent was oily sediment that could not be recycled and is disposed as a hazardous waste offsite.

The installation was able to reduce the volume of hazardous waste disposed offsite by 97.4 percent by using ESI's onsite recycling process.

Beneficial Reuse of Water

The installation is reusing water in the OWSs in a beneficial manner as described in the following subsections. The types of OWSs used at the facility, technical specifications, and standard operating procedure are provided to support this finding.

Types of OWSs Currently at the Installation

An inventory of OWSs in 1997 showed that the installation had 73 OWSs onsite:

- There were 27 manufactured by Highland Tank & Manufacturing Company.

- There were 37 simple concrete vaults.

- There were 9 were manufactured by Great Lakes, Landa, Coalesca, McTighe, and Wemco.[7]

The installation is currently upgrading its OWS and washrack systems to include built-in water recycling systems. The entire construction project is expected to be completed by 2006, and the exact schedule and construction activities are dependent upon the

availability of funding from Congress. The Highland OWSs are representative of current operations at the installation.

Technical Specifications for OWSs

CH2M HILL obtained and reviewed technical brochures and literature from Highland Tank & Manufacturing Company that explain the operation of its OWSs in detail. One article in a trade magazine states that:

> *"The separator unit is designed to operate full of water at all times. As Aymong noted, the separator operates on the principle of gravity displacement. As wastewater enters via the inlet, an equal amount of clarified water leaves through the outlet, or water-discharge pipe. Aymong claims that the Highland separator is engineered in such a way as to allow a "quiet area" for oil to rise to the surface."*[8]

Highland Tank & Manufacturing Company conducted performance tests at Loring Air Force Base[9] and the Naval Communication Unit Fuel Farm in Maine in 1991.[10] An important step in the testing procedure is:

> *"The oil water separator was cleaned and then filled to the maximum capacity with clean fresh water."*

Figure 2 is an illustration of an empty OWS. Figure 3 depicts an OWS that is partially filled with water that lacks a "quiet zone" where separation of the oil from the water normally occurs. Figure 4 illustrates an OWS that is filled to the correct level and operates properly. There is a "quiet zone" where the oil globules can coalesce and rise to the surface of the water. The correct operation of a OWS requires the presence of a "quiet zone" for the different wastes to separate into three discrete layers.

Standard Operating Procedures

Because the installation recognizes that its OWSs must be refilled with clean water after being emptied and cleaned, the facility has a standard operating procedure to aid its personnel.[11] After an OWS is cleaned, the installation personnel are required to refill it with clean water and allow the OWS to stand for 24 hours prior to use of the washrack. This water can come from two sources:

- Domestic water supply at the installation
- Water removed from the OWS, cleaned by ESI, and returned to the same OWS

Figure 2: Empty Oil/Water Separator

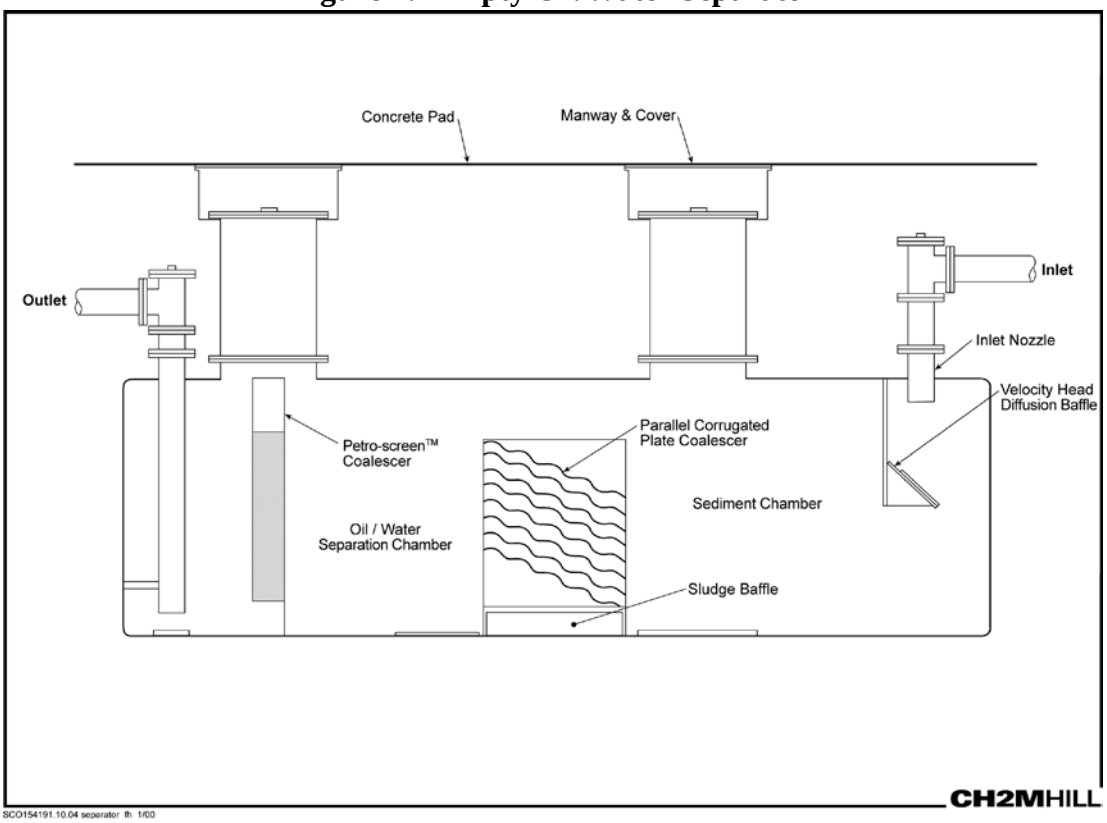


Figure 3: Oil/Water Separator with Insufficient Water to Function Properly

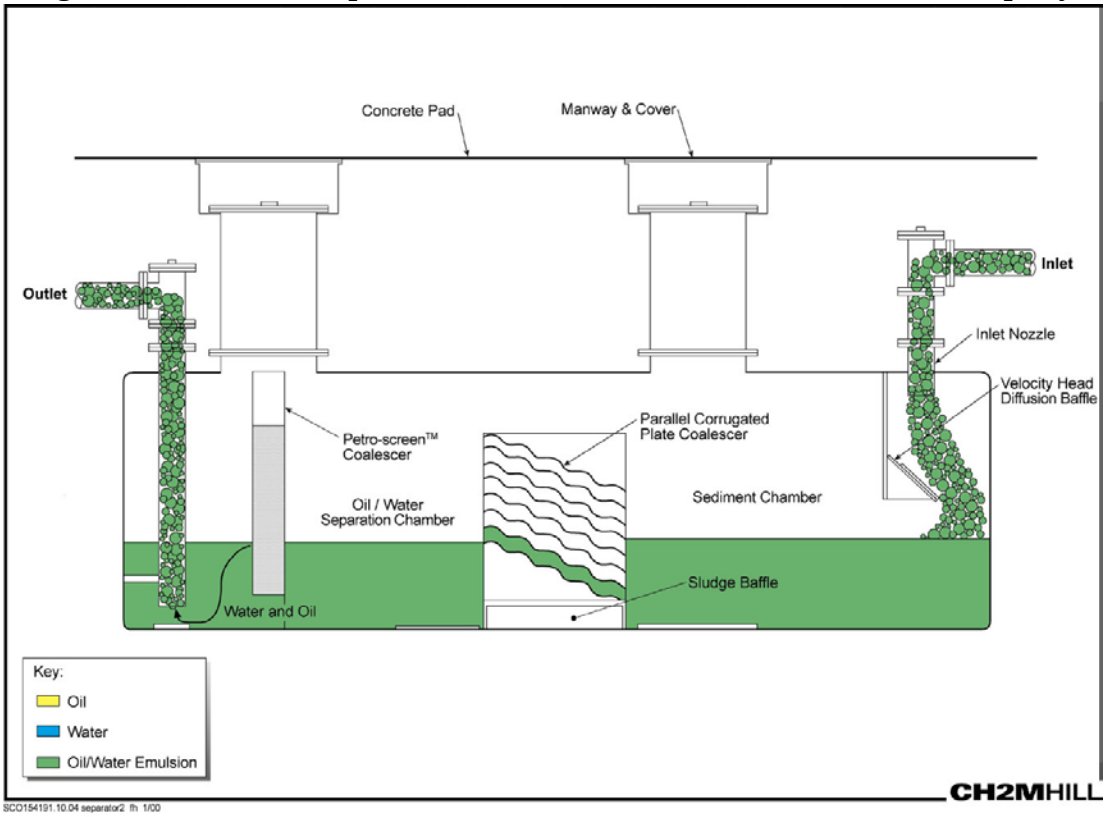
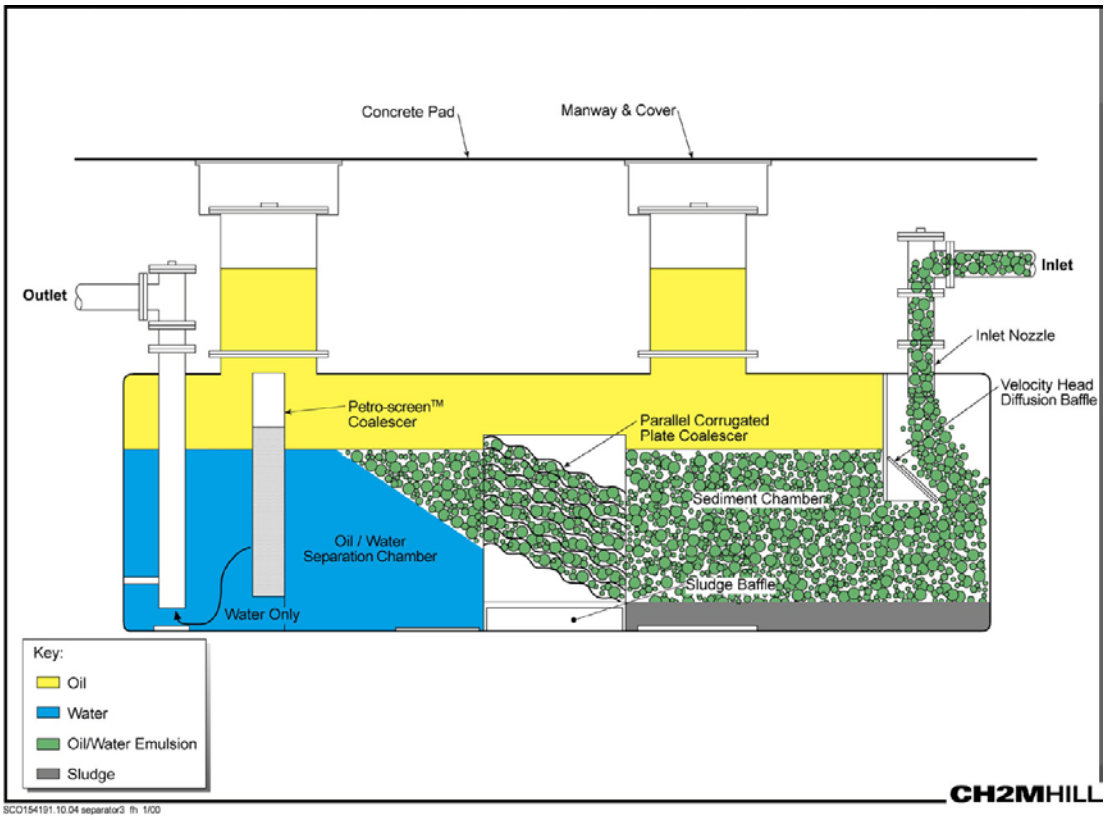


Figure 4: Oil/Water Separator with Sufficient Water to Function Properly



In addition, the installation requires the following from ESI:

> *"The oil water separator must be refilled to a capacity equal to a minimum of eighty (80) percent of the oil/water separator volume. The contractor will return the treated water to the OWS. If necessary, clean water from the base water systems may be used, but only after there is no more treated water left."*[12]

In conclusion, the OWSs must be refilled with clean water to operate properly after each maintenance cycle. The installation had a beneficial reuse of 280,745 gallons (or 2,351,239 pounds) of recycled water in the 10-month period between February and October 2001.

Regulatory Analysis

HSC 25143.2(d)(6) contains a provision that allows a recyclable material to be excluded from regulation as a hazardous waste if it is used or reused as a safe and effective substitute for commercial products.[13, 14] The conditions that must be met are listed in Table 1. The installation complies with all of these items, in addition to the "notwithstanding" provisions under HSC 25143.2(e). The conditions that must be met are listed in Table 2.

Table 1. Compliance with HSC 25143 Requirements.

Requirement	**HSC Citation 25143**	**Demonstration of Compliance/Notes**
The material is non-RCRA.	.2(d)	Influent is nonhazardous per CDM report prepared in 1997. The recycled water, used oil and landfill cover are nonhazardous. Only 1.5% of the total material recycled onsite is a process residual that needs to be disposed offsite as a hazardous waste.
The material is used or reused as a safe and effective substitute for commercial products.	.2(d)(6)	-Contract with ESI requires 100% of the treated water to be returned to the OWS. -Records from February 2001 through October 2001 show 100% of the water is being reused. -Water is a precious commodity in Southern California, an area known for its arid climate and its need to import water from other areas. -Water in Southern California costs between $0.0018 and $0.0033 per gallon. Total cost savings from this recycled water was $1,100 in 2001. -The installation would have to purchase water to refill the OWSs if the recycled water from the transport treatment unit (TTU) was unavailable.
The material is only treated by: • Filtering • Screening • Sorting • Sieving • Grinding • Physical or gravity separation without the addition of external heat or any chemicals • pH adjustment • Viscosity adjustment	.2(d)(6)(A)–(H)	-HSC prohibits the addition of <u>any</u> chemicals during gravity or physical separation. - ESI confirms that no external heat or chemicals are used, only gravity separation, filtration, and a filter press.
The tank is properly labeled with words "Excluded Recyclable Material."	.9(a)	The installation and ESI use this label on all containers or tanks that hold the OWS wastewater.
The facility has an emergency response or business plan.	.9(b)	The installation has Business Plans and an Integrated Contingency Plan (ICP).
The material is stored and handled in accordance with all local ordinances and codes.	.9(c)	ESI holds a TTU permit that was issued by DTSC and is administered by San Diego County Hazardous Materials Management Division (HMMD).
If the material is exported to a foreign country….	.9(d)	Not applicable

Table 2. Compliance with HSC 25143.2(e) Notwithstanding Requirements.

Requirement	HSC Citation 25143.2	Demonstration of Compliance/Notes
All of the following recyclable materials are hazardous wastes… even if the recycling involves use, reuse, or return to the original process if the recycling involves activities or materials described in (c) and (d).	(e)	No specific requirement in HSC 25143.2(e). See subsections below for demonstration of compliance.
Materials that are an RCRA hazardous waste…used in a manner constituting disposal or used to produce products that are applied to the land.	(e)(1)	This process does not produce any RCRA hazardous wastes.
Materials that are a non-RCRA hazardous waste…used in a manner constituting disposal or used to produce products that are applied to the land.	(e)(2)	Only 1.5% of the total material recycled onsite is a process residual that needs to be disposed offsite as a non-RCRA hazardous waste. These sediments do not meet with disposal criteria for the onsite landfill and are manifested offsite for fuel blending/burning.
Materials burned for energy recovery, used to produce a fuel, or contained in fuels…	(e)(3)	Only 1.5% of the total material recycled onsite is a process residual that needs to be disposed offsite as a hazardous waste. These sediments do not meet with disposal criteria for the onsite landfill and are manifested offsite for fuel blending/burning.
Materials accumulated speculatively.	(e)(4)	Not applicable.
Materials determined to be inherently wastelike pursuant to regulations adopted by the department.	(e)(5)	97.4% of the material is recycled and reused in a beneficial manner. 1.5% is a residue from the treatment process.
Used or spent etchants.	(e)(6)	Not applicable.
Used oil.	(e)(7)	Complies with HSC 25250.1(e).

CONCLUSIONS

The installation has shown that it recycles and reuses its water in a beneficial manner during the cleaning of its OWSs in accordance with HSC 25143.2(d)(6). Water is a precious commodity in Southern California, an area known for its arid climate and its need to import water from other areas. A typical price for water in Southern California is between $0.0018 and $0.0033 per gallon. Therefore, total cost savings by the installation

in using recycled water was $1,100 in 2001. The installation would have to purchase water to refill the OWSs if the recycled water was unavailable.

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REFERENCES

[1] Gin, Watson. California Environmental Protection Agency, Department of Toxic Substances Control, Resource Recovery Section. Letter to Lockheed Martin Skunk Works "Onsite Recycling of Wastewater." 16 August 1999.

[2] Peebler, Diana. California Environmental Protection Agency, Department of Toxic Substances Control, Resource Recovery Section. Letter to Deutsch ECD "Onsite Recycling of Oily Wastewater." 29 March 1996.

[3] Payne, Ken. California Environmental Protection Agency, Department of Toxic Substances Control, Resource Recovery Section. Letter to Applied Micro Circuits Corporation "Permit Exemption for Wastewater Recycling System." 12 April 2000.

[4] Peebler, Diana. California Environmental Protection Agency, Department of Toxic Substances Control, Resource Recovery Section. Letter to Blue Spring Water Recycling Systems "Onsite Recycling of Rinse Waters." 10 March 1998.

[5] CDM Federal Programs Corporation. *Non-Domestic Wastewater Management Plan for MCB Camp Pendleton, California*. 10 January 1997.

[6] Keough, Christopher. Enviremedial Services Incorporated. Correspondence, E-mails, and Telephone Conversations. December 2000 through May 2001.

[7] *Spill Prevention and Countermeasures Control (SPCC) Plan MCB Camp Pendleton*. October 1997.

[8] "Highland Tank Exploits the Laws of Gravity to Collect Waste Oil." *Petroleum Marketer*. November-December 1986.

[9] *Performance Test #6 Underground Model HTC Oil Water Separator Tank*. Highland Tank & Mfg. Co. October 21, 1991.

[10] *Performance Test #7 Underground Model HT Oil Water Separator Tank*. Highland Tank & Mfg. Co. August 6, 1991.

[11] *Procedures for Maintaining Oil/Water Separators*. United States Marine Corps Facilities Maintenance Department, Marine Corps Base Camp Pendleton. 24 July 1998.

[12] Defense Reutilization and Marketing Service (DRMS) contract between ESI and MCB Camp Pendleton dated 15 July 1999.

[13] Peebler, Diana. California Environmental Protection Agency, Department of Toxic Substances Control, Resource Recovery Section. Telephone Conversation. March 2000.

[14] Corcoran, Charles. California Environmental Protection Agency, Department of Toxic Substances Control, Resource Recovery Section. Telephone Conversation. September 2001.

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