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TECHNICAL REPORT
NATICK/TR-95/002

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PERSONAL HYGIENE BODY WIPE

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13. ABSTRACT (Maximum 200 words) Military doctrine requires a soldier to take a shower at least once every seven days to maintain certain health standards. The objective of the PHBW is to provide the soldier with a temporary means of maintaining personal hygiene and sanitation when water/showers are not available. The PHBW will improve personal hygiene, morale and quality of life of the soldier in the field when water is not available. Statistically designed technical user tests of several typical commercially available wipes were conducted. The wipe selected as the most suitable for the soldier was one of the most effective soil removers, the most cost effective and was readily available from commercial sources. The formulation in the wipe is used on babies and is alcohol free and hypo-allergenic. Ingredients include cocoamphodiacetate, aloe gel, lanolin, water, propylene glycol, preservatives and an adult fragrance. Toxicity clearance was granted by the Army Materiel Command Surgeon. The size of the wipes will be at least 7.2" x 8.5" and will be packed 12 wipes per package. A resealable label will allow removal of one wipe at a time. The PHBW will be managed by the General Service Agency and will be issued through the Class I distribution system. It will be regulated by revised Commercial Item Description A-A-641B, Hand Cleaner, Body Wipe (Pre-moistened Paper Towelette in a Packet).				
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PREFACE

The Personal Hygiene Body Wipe (PHEW) project was a one-year program funded by the Soldier Enhancement Program (SEP) under customer order 1221.

The appendices of this report contain the Operational Requirements Document (ORD) for the PHEW, which was approved 14 September 1993. The Test and Evaluation Master Plan (1) and the Acquisition Plan/Program Management Plan (Appendix D) were submitted to the Combat Developer, PM-Soldier, TSM-Soldier and other coordinating activities on 15 January 1994. The market survey, milestone schedule, yearly plan, toxicity clearance, commercial item description (CID) and technical user pilot evaluation are also included in the appendices of this report.

The technical data package for the PHEW was transitioned to the General Services administration (GSA) on 1 August 1994. The GSA will incorporate the PHEW into Commercial Item Description A-A-461, Hand Cleaner (Pre-moistened Paper Towelette in a Packet)(2), as a type III item (Appendix F). The PHEW is an operational health and comfort item (procurement class VI) and will be issued through the class I distribution system. It is also a Common Table of allowance (CTA) 50-970 item.

This project started on 1 October 1994 and was terminated on 30 September 1994.

PERSONAL HYGIENE BODY WIPE

INTRODUCTION

Military doctrine requires a soldier to shower at least once every seven days to maintain certain health standards (3,4,5). Currently, the soldier in the field is unable to maintain personal hygiene and sanitation when water/showers are not available. This impacts on soldiers performance, susceptibility to infection and poor wound healing. The objective of this project was to provide the soldier in the field with a temporary substitute for showers, as well as a means to refresh himself/herself when water is not available. The approach was to procure and evaluate commercially available, non-developmental wipes to determine their effectiveness for cleansing the body.

Materials and Methods

TABULAR CORRELATION AND SUMMARY OF PILOT REPORT

Technical User test

Seven commercial body wipes representative of chemical formulations commonly available on the market were tested (see User Test in Appendix G). They were evaluated for soil removal, physical attributes and effect on the user by 14 civilian test subjects (9 females and 5 males).

Test soil and test design

Table 1 outlines the ingredients of the test soil (2), test design, and statistical analytical methods used in the technical testing. After rubbing 0.1 gram of test soil on the palm of one hand with the forefinger of the opposite hand, the subject was given two minutes to remove the soil with the wipe provided. Two questionnaires were filled out and answers were statistically analyzed (User Test, Appendix G).

Table 1. Technical Testing of Nondevelopmental Body wipes.

Test Soil:

Charcoal and mineral oil mixture (A-A-461A).

0.1 gram spread on palm of hand for one minute.

Two minutes for removal of soil.

Test Design:

Repeated measures design.

Latin square.^a

Statistical Analysis of Data:

Two questionnaires.

Analysis of variance.

Tukey post hoc analysis.

Chi square analysis.

^a The Latin square design determined the order in which the wipes were presented to each test subject.

Candidate wipes

The candidate wipes evaluated are shown in Table 2. Only three had antibacterial components, namely alcohol and Parachlorometaxyleneol (PCMX). Cost of the wipes ranged from \$0.02 each to \$0.50 each.

Table 2. Candidate nondevelopmental (NDI) body wipes evaluated for the military.

Wipes	Company	Size (inch)	Active ingredient	Antibacterial component	Cost (ea)
TW 127A	Texwipe ^R	12 x 12	---	No	\$0.50
TW 127B	Texwipe ^R	12 x 12	Alcohol	Yes	\$0.50
Baby cleanups	Presto ^R	6 x 6.75	CADA ^a	No	0.02
Baby wipes	Presto ^R	7.2 x 8.3	CADA	No	\$0.04
Baby wipes (natural)	Presto ^R	7.2 x 8.3	Aloe Gel	No	\$0.03
Clean & Safe	Texwipe ^R	5.5 x 7.75	QAC ^b & Alcohol	Yes	\$0.31
Vionex	Viro Inc ^R	5.25 x 7.5	PCMX ^c & Alcohol	Yes	\$0.17

^a Cocoamphodiacetate

^b Benzethonium chloride (0.13%)

^c Parachlorometaxyleneol (0.5%)

^R Registered brand name

RESULTS

Performance ranking of wipes

Table 3 shows how the candidate wipes were numbered and ranked by performance of the salient characteristics shown in the following tables. The rankings are based on scores presented in the pilot study but do not indicate statistical significances. The top three performing wipes overall, in order of performance, were wipe #2 (Texwipe 127B), wipe #1 (Texwipe 127A) and wipe #4 (Presto baby wipes). As the user test pilot report (Appendix G) showed, the performance of these three wipes was significantly better than the other wipes.

Table 3. Overall performance ranking of wipes.

Wipe No.	Name	Company	Ranking ^a
1	127A	Texwipe	2
2	127B	Texwipe	1
3	Baby Cleanups	Presto	6
4	Baby Wipes	Presto	3
5	Baby Wipes (Natural)	Presto	6
6	Clean & Safe	Texwipe	4
7	Vionex	Viro	5

^a 1 = Best; 7 = Worst

Cleansing effectiveness

Table 4 shows the cleansing effectiveness of the 7 personal hygiene wipes tested. The wipes were evaluated for soil removal efficiency, cleansing time and the number of wipes used. The wipes (see Table 3 for identification number) were ranked on a scale of 1 (best performer) to 7 (worst performer). Wipes 2, 1, and 4 respectively, were the best soil removers and they also removed the test soil (see Table 1) in the shortest period of time. The required soil removal time was two minutes (2). Only one wipe of each of the top 3 performers was required to remove the soil. Wipes 2, 1 and 4 respectively, also had the best overall ranking for preference.

Table 4. Cleansing effectiveness of seven personal hygiene body wipes

Salient Characteristics	Position Rating of Wipes Tested						
	Wipe No.						
	1	2	3	4	5	6	7
Soil removal	2	1 ^a	5	3	7 ^b	4	6
Cleansing time	2	1	7	3	6	5	4
No. wipes used	1	1	7	1	6	5	4
Total	5	3	19	7	19	14	14
Overall Rank (preference)	<u>2</u>	<u>1</u>	6	<u>3</u>	6	4	4

a 1 = Best

b 7 = worst

Physical attributes

The wipes were evaluated for the physical characteristics listed in Table 5. Based on these physical characteristics, wipes 2, 1 and 6 respectively, emerged as the top three performers, overall. Although it replaced wipe #4 for third position, wipe #6 was already rejected in Table 4, on the grounds that it was not as effective in removing soil and required more time to clean than wipe #4. It should also be noted that all characteristics of wipe #4 were perceived as positive. Approximately 50% of the test subjects responded that they would not use wipe #5 on their entire body because they disliked the smell and because it was too dry. This was indicated by the negative ratings wipe #5 received for these two characteristics. Wipe #7 tied wipe #4 for overall ranking, but was not as effective in soil removal as wipe #4, and more than one wipe was required as previously shown in Table 4. Wipes #1 and #2 were judged to be the most soothing and refreshing. None of the wipes caused itchiness or irritation. As previously stated, these rankings do not indicate statistical significance.

Major characteristics

Table 6 shows the ranking of the wipes when three major characteristics were compared. Wipes 1, 2 and 3 were the best liked and the most effective for removing the test soil. The test subjects considered wipes 1, 2 and 6 the most suitable for use on the entire body because of their pleasant odor and sufficient wetness. There was a significant difference, overall, between wipes 1 and 2 and the other five wipes. However, there was no significant differences among the other five wipes except that wipe 4 was significantly more effective than wipe 6 for cleansing effectiveness.

Table 5. Physical characteristics of seven wipes.

Salient Characteristics	Wipe No.						
	1	2	3	4	5	6	7
Durability	1+ ^a	1+	1+	1+	1+	1+	1+
Smell	2+ ^b	2+	1+	1+	-	2+	1+
Color	2+	2+	2+	2+	2+	2+	2+
Stickiness	1+	2+	1+	1+	1+	2+	2+
Greasiness	2+	2+	2+	2+	2+	2+	2+
Wetness	2+	3+ ^c	2+	2+	-	2+	2+
Soothing	3+	2+	1+	2+	1+	2+	1+
Refreshing	2+	3+	2+	2+	1+	2+	2+
Itchiness	1+	1+	1+	1+	1+	1+	1+
Irritation	1+	1+	1+	1+	1+	1+	1+
Total	17	19	14	15	8	17	15
Overall ranking	<u>2</u>	<u>1</u>	6	<u>3</u>	7	2	3

^a1+ = neither good nor bad

^b2+ = slightly good

^c3+ = moderately good

Table 6. Comparison of wipes by major characteristics.

Characteristic	Position Rating Of Wipes						
	Wipe No.						
	1	2	3	4	5	6	7
Liked the most	2	1	7	3	6	4	5
Most suitable for whole body	2	1	7	4	5	3	6
Cleansing effectiveness	2	1	7	3	6	4	5
Average Ranking	<u>2</u>	<u>1</u>	7	<u>3</u>	6	4	5

Summary of attribute ranking

Table 7 summarizes the rankings of the three attribute categories presented in tables 4 to 6. Wipes 2, 1 and 4 respectively, again emerged as the top three performers. Thus, the rankings in tables 4 to 7 were in agreement. Therefore, the wipe recommended for use by the army will be selected from these top three performers.

Table 7. Summary of attribute ranking

Category	Wipe No.						
	1	2	3	4	5	6	7
Cleansing effectiveness	2	1 ^a	6	3	6	4	4
Physical characteristics	2	1	6	3	7 ^b	2	3
Wipe comparison	2	1	7	3	6	4	5
Overall rank	<u>2</u>	<u>1</u>	6	<u>3</u>	6	4	5

^a 1 = Best

^b 7 = worst

DISCUSSION

Based on the results of the technical user test, which were statistically analyzed in the pilot report, wipe #4 (or equivalent wipe and formulation) was selected for the Army. It was more cost effective, cleansing effectiveness was not statistically different than wipes ranked #1 and #2, it was readily available, and was completely compatible with the class one procurement system. Additionally, it contained a common formulation (see CID in Appendix F), so that it can be provided by a number of different companies. The active cleansing ingredient is cocoamphodiacetate, which is a common agent used in baby wipes by many companies. The soothing and skin softening agents are lanolin and aloe gel. The moisturizers are water and propylene glycol. The only ingredients that may vary with different producers are the preservatives which may be used in any suitable and effective combination.

This formulation received a toxicity clearance from Headquarters, U.S. Army Materiel Command indicating "that the body wipe does not have any anticipated adverse health effects" (Appendix E). The cleansing solution shall comply with the Consumer Products Safety Act and shall not be hazardous or toxic under normal conditions of use. The solution will also be alcohol free and hypo-allergenic.

The PHBW was not tested for antibacterial properties and was not field tested, as directed by the SEP Design Review Board. Dermatological studies were also considered unnecessary by the Combat Developer, U.S. Army Quartermaster Center and School, Fort Lee, VA.

A larger size wipe than is currently available ($\geq 7"$ by $8.5"$) was required, packed 12 wipes to a package (12-pack). The size of the 12-pack must not be larger than $4.5"W$ by $8"L$, so that it will fit into pockets of the standard battledress uniform. A resealable label will allow the removal of one wipe at a time. Instructions for use of the PHEW and ingredients will be included on the package along with information required by regulatory agencies.

The technical data package was transitioned to the General Services Administration (GSA). The GSA will incorporate the PHEW into Commercial Item Description A-A-461, Hand Cleaner (Pre-moistened Paper Towlette in a Packet)(2), as a type III item (Appendix F). It was recommended that the title be changed by adding "Body Wipe" after "Hand Cleaner". The National Stock Number for the PHEW will be obtained by the GSA, after which they may be purchased by military units.

CONCLUSIONS AND RECOMMENDATIONS

The results of the technical user test indicated that wipe #4 (or equivalent wipe and formulation) was the wipe of choice for use by the Army. It was more cost effective, cleansing effectiveness was not statistically different than wipes ranked #1 and #2, it was readily available, and was completely compatible with the class one procurement system. Additionally, it contained a common formulation (see CID in Appendix F) which is hypo-allergenic and free of alcohol, so that it can be provided by a number of different companies. The active cleansing agent is cocoamphodiacetate.

Larger size wipes than are currently available ($\geq 7"$ by $8.5"$) should be used and they should be packed 12 wipes to a package (12-pack). The size of the 12-pack must not be larger than $4.5"W$ by $8"L$, so that it will fit into pockets of the standard battledress uniform. A resealable label is required to allow the removal of one wipe at a time and to prevent drying of the remaining wipes.

The wipe will be managed by GSA and procured through that Agency.

This document reports research undertaken at the U.S. Army Natick Research, Development and Engineering Center and has been assigned No. NATICK/TR-95/002 in the series of reports approved for publication.

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APPENDICES

APPENDIX A

CUSTOMER ORDER, MILESTONE SCHEDULE AND FISCAL YEAR PLANS

CUS 1221

TITLE: CLEANSING BODY WIPE FOR PERSONAL SANITATION

REQUIREMENT/TECHNICAL OBJECTIVE

Military doctrine requires a soldier to take a shower at least once every seven days to maintain certain health standards. The objective is to provide the soldier with a temporary means of maintaining personal hygiene and sanitation when water/showers are not available.

TECHNICAL APPROACH

Large versions of commercially available, nondevelopmental wipes with or without a biocide, will be tested to determine their effectiveness for cleansing the body. Human factors testing procedures will be used to determine their efficacy, durability and military application.

MILESTONE SCHEDULE

TITLE	START	END
1 Perform literature search	060193	093095
2 Purchase NDI prototype towelettes	070193	123093
3 Conduct in-house technical test to determine efficacy of NDI prototype commercial body wipe	100193	123193
4 Determine packaging and MANPRINT requirements	012194	053094
5 Prepare tech data package and transition to DLA	050194	093094
Write final report	060195	093095

Plans for NEXT FISCAL YEAR (BY QUARTER)

1QFY94. Purchase different types of NDI towels for user evaluations. Conduct user evaluation of NDI body wipes at Natick. Conduct market survey. Consult Subsistence Protection Branch and MANPRINT to determine and resolve relevant issues. 2QFY94. Involve MANPRINT, Natick Safety Office and Packaging Systems Branch to determine safety and packaging requirements. 3QFY94. Initiate preparation of Technical Data Package. Resolve packaging and MANPRINT issues identified. Obtain toxicity clearance by AMC Command Surgeon. 4QFY94. Complete Technical Data Package and transition to GSA. Prepare a letter summary report.

APPENDIX B

MARKET SURVEY OF PERSONAL HYGIENE BODY WIPES

22 FEB 1994

MEMORANDUM FOR RECORD

SUBJECT: MARKET SURVEY OF PERSONAL HYGEINE BODYWIPES

1. Producers of 15 body wipes were surveyed to determine unit price, wipe size, and number of wipes per package.
2. The survey included nationally known brands such as Chubs, Huggies, Nice'N Clean, Diaperine, Wet Ones, Wet Nap, Johnson & Johnson Baby Cloths, Osco Baby Wipes, CVS Baby Wipes, Wash a Bye Baby, Sofkins, Presto Baby Clean-ups, Clean & Safe and Vionex.
3. Most of the NDI wipes are about 5" x 7" or smaller. None of the Producers make a 6 count pack and only two (Scott and CVS) makes a 12 count pack. Four brands of wipes are packaged individually, and only 4 brands come in a travel pack containing 12 to 20 wipes per package. Nine brands provide the wipes as 40 to 160 count packages. The largest NDI wipe was 7"x 8.5", made by Presto.
4. Prices of the baby wipes ranged from \$0.02 to \$0.05 each. Four industrial wipes cost from \$0.17 to \$0.31 each. Three producers would not release price information over the telephone. Wipes at \$0.02 each are not available in a small travel pack. Of the 4 travel packs available, the lowest price per wipe was in a 20 count package produced by Presto, at \$0.03 for a 6"x 6.75" wipe.
5. Of the wipes surveyed, seven representing common and typical formulations were selected for in-house technical and human factors testing.
6. One of the top three performing wipes was produced by Presto Co. The wipe contains a formulation without alcohol that is typical of most baby wipes and is readily available from several suppliers.
7. The Presto Co. can provide a NDI, 12 count package containing 7"x 8.5" size wipes containing the pretested formula for \$0.60 per package (\$0.04 each). This price includes private label, artwork, packaging and delivery. The wipes are thick at 54 grams/sq. yard, and strong, with a wet strength ranging from 0.92 pounds (transverse direction) to 1.15 pounds (machine direction).
8. It is recommended that a CID be written to include the above characteristics (item 7) and common formulation tested at Natick, so that competitive bids can be obtained to provide the most cost effective and best performing body wipe.

Edmund M. Powers
RDB, RSD, SusD

CF:
C, RDB, RSD, SusD
C, RSD, SusD
C, CEA&P, SusD

APPENDIX C

OPERATIONAL REQUIREMENTS DOCUMENT (ORD)

OPERATIONAL REQUIREMENTS DOCUMENT (ORD)

The ORD describes the operational capabilities and requirements for the PHEW. A mission needs statement preceding this ORD was not required since the initiative to provide this capability originated from the congressionally mandated Soldier Enhancement Program. The ORD is presented in 8 parts:

1. General description of operational capabilities.
2. Threat.
3. Shortcomings of the existing system.
4. Capabilities Required.
5. Integrated Logistic Support.
6. Interoperability.
7. Force Structure/Basis of Issue.
8. Schedule considerations.



DEPARTMENT OF THE ARMY
U.S. ARMY QUARTERMASTER CENTER AND SCHOOL
FORT LEE, VIRGINIA 23801-5000



ATSM-CDM (310-25)

14 September 1993

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Operational Requirements Document (ORD) for Personal Hygiene Body Wipe (PHBW)

1. Reference draft Memorandum of Instruction (MOI) for the Soldier Enhancement Program, ATCD-SE/AMCDE-SS.
2. Enclosed is the ORD for the PHBW. The referenced MOI specified is used to expedite this project into the Soldier Enhancement Program.

Encl

ROBERT K. GUEST
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OPERATIONAL REQUIREMENTS DOCUMENT (ORD)
FOR
PERSONAL HYGIENE BODY WIPE

1. **GENERAL DESCRIPTION OF OPERATIONAL CAPABILITY:** Military doctrine requires soldiers to shower at least once every seven days to maintain certain health standards. Currently, there is nothing available to the soldier in the field for personal sanitation/hygiene when water/showers are not available. The Personal Hygiene Body Wipe (PHBW) will be used by the individual soldier when water/showers are not available or readily accessible. The Type I PHBW will consist of militarization of commercially available items similar to handwipes and would represent an interim solution. Based upon field testing and soldier in-field evaluations, soldier acceptance of the Type I PHBW will be presented to decision authorities for approval of a Type II improved size NDI PHBW. The Congressionally-mandated Soldier Enhancement Program (SEP), the objective of which is to increase the lethality and survivability of the soldier through accelerated acquisition of lighter, more lethal weapons and improved "soldier items" including survivability items, communications equipment, navigation aids, and individual soldier sustainability items for soldier use, is the initiative to provide this capability. Therefore, a mission need statement is not required to precede this ORD.

2. **THREAT:** The Personal Hygiene Body Wipe will be as vulnerable as any other individual "soldier item" to the full spectrum of threat destruction/disruptive capabilities at all levels of conflict. Major threats result from its proximity to targets/soldiers in all units across the operational continuum, especially in the company, battalion, brigade and division areas. Destructive capability such as direct and indirect fires, missile effects, small arms fire, and sabotage explosives can damage or destroy the PHBW and harm/kill soldiers near the target.

3. **SHORTCOMINGS OF THE EXISTING SYSTEM:** Currently, there is nothing available to the soldier in the field for personal sanitation when water/showers are not available. Doctrinal field services support units for showers are resourced to provide each soldier one shower every seven days. Feedback from individual soldiers who participated in Operation Desert Shield/Storm indicated sanitation facilities needed improvement. Studies have shown that this lack of sanitation facilities can potentially lead to problems associated with poor performance, susceptibility to infection, and poor wound healing.

4. CAPABILITIES REQUIRED:

a. System Performance:

* (1) The PHBW must meet the basic requirements for personal hygiene items established in AR 40-5 and FM 21-10-1.

Rationale: These publications dictate standards that personal hygiene items must meet to preclude soldiers exposure to unhealthy/unsanitary conditions from such products.

* (2) The PHBW should be of adequate size. The PHBW should be the size of medium towlettes (11" x9" range is desired).

Rationale: The PHBW must contain sufficient moisture to clean the entire body skin surfaces. One PHBW towel could be used on specific areas of the body; just the face, genital areas, feet, under the arms, etc. This is the intended purpose of this item. Cleaning skin surfaces and reducing bacterial buildup will prevent infections, reduce body odors, and improve morale.

* (3) Vapors from the PHBW should not cause adverse side effects such as rashes and irritation of skin, eyes or mucous membranes. The PHBW should be hypo-allergenic.

Rationale: Adverse side effects could interfere with the soldier's performance of his/her mission and could result in the soldier being a casualty, thereby degrading individual and unit readiness.

* (4) The PHBW must meet soldier acceptability as measured by ratings above the midpoint on the hedonic scale, using the same criteria as is currently used for other individual soldier equipment/items.

Rationale: These wipes must be generally acceptable to be cost effective and provide for increased comfort for the soldier in the field.

(5) Wipes must be premoistened. They will also be packaged and sterilized to prevent loss of the moisture or other active ingredients and to prevent mold (mildew) growth.

Rationale: Wipes are to be used as a temporary substitute for a shower when water is not available or needs to be conserved for drinking and cooking. Appropriate nonpermeable packaging and sterility are necessary to retain moisture and prevent mold destruction during long term storage.

(6) The PHBW must address MANPRINT issues associated with labeling, packaging design, and usage directions.

Rationale: Soldiers will have properly sized, readily available labeling and instructions for use visible on the wipe package. Package design is important to ensure the wipes are properly protected, yet also user friendly.

(7) Should be of sufficient wet strength that it does not break apart during normal use.

Rationale: The PHBW must be strong enough to complete the cleaning process.

b. Logistics and Readiness: The PHBW must be capable of distribution via the standard Class I supply system.

Rationale: The PHBW must be an item moved by the standard Class I supply system for efficiency and cost effectiveness. This is a Class VI supply item and all such items are distributed through the Class I supply system. This avoids any potential for a unique distribution requirement.

c. Critical System Capabilities: These capabilities are marked by an asterisk in paragraph 4a above.

5. INTEGRATED LOGISTIC SUPPORT.

a. Management and distribution of the PHBW must be compatible with the standard Class I logistic system. As a Class VI item, the PHBW will be issued through the Class I system. All soldiers will be users of the PHBW. This item shall pose no increased logistical burden on the Class I logistics system.

b. Surveillance required for the PHBW shall not require additional manpower. Further, there shall be no new or unique storage facilities, packaging, handling, or transportation requirements.

c. Health Hazard Assessment (HHA) is an integral part of the design process and will be conducted to evaluate health risks to users and other personnel. This assessment will identify hazards or potential hazards associated with this product. A HHA will be requested from the Commander, U.S. Army Materiel Command, ATTN: AMCSG-H, 5001 Eisenhower Avenue, Alexandria, VA 22333-0001, early in the development cycle. This HHA will be updated for each major milestone review.

6. INTEROPERABILITY. All U.S. military services will potentially use the PHBW, and interoperability requirements will exist to support those other services.

7. FORCE STRUCTURE/BASIS OF ISSUE. The PHBW will be requisitioned, stored, accounted for, and issued in the same manner as all individual operational health and comfort (Class VI) items, in accordance with the current Class I logistics system. There shall be no requirement for additional personnel or equipment to support this item. Exact BOI will be determined during testing.

8. SCHEDULE CONSIDERATIONS. The Type I technical data package is expected to be ready for transition to Defense Logistics Agency by the end of FY94. Decision criteria for an improved PHBW will also be provided by the end of FY94. If a Type II PHBW is approved, the TDP will be provided by the end of FY95. Adoption of the PHBW will be accomplished by decisions rendered by the Department of the Army, Office of The Surgeon General (OTSG) in coordination with the U. S. Army Quartermaster Center and School (USAQMC&S).

Approved:



ROBERT K. GUEST
Major General, U. S. Army
Commanding

**ANNEX A
COORDINATION**

1. This ORD was staffed with activities having an interest in this project.

<u>ACTIVITY</u>	<u>COMMENTS</u>	<u>ACCEPTED</u>	<u>NOT ACCEPTED</u>
TRADOC	5	5	0
OTSC			
AMEDDC&S	2	2	0
NRDEC	9	9	0
USAQMC&S AFSD			
TSM-Soldier	5	5	0
PM-Soldier			
TOTAL	21	21	0

2. No responses indicate concur with document as written, with no specific comments.

ANNEX B**FUNDING**

The preliminary estimated cost for Research, Development, and Engineering Center is 351,000k over two fiscal years. This estimated funding is scheduled as follows:

FY 94	FY 95
<hr/>	<hr/>
171k	180k

Procurement funding will be centralized and controlled by Department of the Army Deputy Chief of Staff for Logistics.

ANNEX C
CRITICAL OPERATION ISSUES AND CRITERIA

TBD

APPENDIX D

ACQUISITION PLAN/PROGRAM MANAGEMENT PLAN



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY QUARTERMASTER CENTER AND SCHOOL
FORT LEE, VIRGINIA 23801-5000



ATSM-CDM (310-2s)

9 Mar 94

MEMORANDUM FOR

Cdr, US Army Training and Doctrine Command, ATTN: ATCD-SE (CPT Hamilton), Fort Monroe, VA 23657
Cdr, TRADOC System Manager-Soldier, ATTN: ATZB-TS (SGM Robertson), USAIC, Fort Benning, GA 31905
Cdr, Program Manager Soldier, ATTN: Jim Hodges, 14050 Dawson Beach Road, Woodbridge, VA 22191-1419
Cdr, USA Natick Research, Development, and Engineering Center, ATTN: Brian Hill, Natick, MA 01760-5015

SUBJECT: Draft Acquisition Plan/Program Management Plan (PMP) for the Personal Hygiene Body Wipe (PHBW)

1. The USAQMC&S concurs with the proposed Acquisition Plan/Program Management Plan, made by TRADOC's System Manager-Soldier. The USAQMC&S does not agree with any testing to determine dermatological effects.

RATIONALE: Current candidate is sold commercially for cleaning infants' skin.

2. The USAQMC&S position is to have the PHBW packaged with 12 towellettes in each package. Request that Natick's Research, Development, and Engineering Center implement this action to expedite the procurement and fielding process of the PHBW.

3. POC for this action is Major Andres Perez, Chief, Subsistence Branch, DSN 539-3725 or commercial (804) 765-3725.

TOMMY H. ROBERSON
LTC, QM

Director of Combat Developments

SEP PROJECT
ACQUISITION PLAN / PROGRAM MANAGEMENT PLAN

1. Title: Personal Hygiene Body Wipe (PHBW)

2. Technical Approach: The project involves modification, adaptation, test and evaluation of commercially available, nondevelopmental (NDI) wipes. An evaluation will be conducted to determine the wipe's effectiveness for cleansing the body. Performance testing will be used to determine the wipe's efficacy, durability, and military utility. This information will then be used for the purpose of down selecting to a particular type of commercial item.

a. Schedule:

Program Initiation	1 Jun 93
Perform Literature Search	1 Jun-30 Sep 93
Purchase NDI Prototype Towelettes	1 Jul-31 Dec 93
Small Scale Technical Test of NDI Prototype Wipes	1 Oct-31 Dec 93
SEP Design Review	21 Jan 94
Determine Packaging and MANPRINT Requirements	21 Jan-30 May 94
Prepare Technical Data for CID and Transition	3 Mar-30 Sep 94

b. Work Plan:

FY93: Perform market investigation of product. Initiate contract for purchase of towels from companies found in market search.

FY94: Purchase NDI towels containing new and/or previously evaluated formulations. Determine efficacy and formulation of towels for removing soil from skin as necessary. Finalize packaging requirements. Prepare and coordinate Commercial Item Description (CID).

3. R&D Funding (\$K):

	<u>FY93</u>	<u>FY94</u>
In-House	21	75
OGA	-	-
Contract	-	-
Total	21	75

4. Integrated Logistics:

a. Standardization: Management and distribution of the PHBW will be compatible with the standard Class I logistics system and will pose no additional burden on the system. There shall be no new or unique storage facilities, packaging, handling, or transportation requirements.

b. Procurement Funding: Adoption of the PHBW will be accomplished by receiving approval from the SEP Review Board. Procurement funding will not be budgeted until the PHBW is adopted.

c. Other ILS Concerns: A Health Hazard Assessment (HHA) will be conducted early in the developmental cycle to evaluate health risks to user, handler, and warehouse. This assessment will identify all potential hazards associated with this product. This HHA will be updated at each major milestone review.

5. Acquisition Strategy: A Commercial Item Description (CID) will be written for the selected PHBW. Because of the Federal Supply Class for this item, the item will be managed by the General Services Administration. The item, if desired, may be changed to Defense General Supply Center management by exception. But the item will be purchased by government agencies under this CID.

6. Points of Contact:

<u>Primary Points of Contact</u>	<u>Organization</u>	<u>Phone No. (DSN)</u>
Combat Developer (MAJ Andy Perez)	USAQMS&C	539-3725/ 539-7632
Materiel Developer (Edmund Powers)	NRDEC ATTN: SATNC-WRA	256-4985
Technical Tester (John Mullamo)	TECOM ATTN: AMSTE-TA-S	298-1459/ 298-9174
Operational Tester (MAJ Mason)	TEXCOM	738-1477/ 738-1475
Training (CPT Alexander Hamilton)	HQTRADOC ATCD-SE	680-3039
TRADOC Systems Manager-Soldier (SGM Charlie Robertson)	TSM-Soldier ATSH-TS	835-1189/ 835-1377
Project Manager-Soldier (Jim Hodges)	PM-Soldier AMCPM-SDR	356-2659/ 356-2407

7. Project Plan Coordination/Concurrence:

SIGNATURE

DATE

PM-Soldier_____

Concur/NonConcur_____

TSM-Soldier_____

Concur/NonConcur_____

Material^E Developer *Greg Shultz*

Concur/NonConcur 49294

Combat Developer_____
(QMC&S)

Concur/NonConcur_____

Developmental Tester_____
(TECOM)

Concur/NonConcur_____

Developmental Assessor_____
(TECOM)

Concur/NonConcur_____

Operational Tester_____
(TEXCOM)

Concur/NonConcur_____

Operational Evaluator_____
(OEC)

Concur/NonConcur_____

APPENDIX E

TOXICITY CLEARANCE OF PERSONAL HYGIENE BODY WIPE

14



DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY MATERIEL COMMAND
5001 EISENHOWER AVENUE, ALEXANDRIA, VA 22333-0001



REPLY TO
ATTENTION OF

AMCSG

28 June 1994

✓ MEMORANDUM FOR Commander, U.S. Army Natick Research, Development
and Engineering Center, ATTN: SATNC-ZSR,
Natick, MA 01760-5033

SUBJECT: Health Hazard Assessment for the Personal Hygiene Body
Wipe

1. References:

a. 1st Endorsement, HQ USAEHA, HSHB-MO-T, 22 June 1994,
subject: Toxicity Clearance of the Personal Body Wipe,
(enclosed).

b. 1st Endorsement, HQ AMC, AMCSG-H, 26 April 1994, subject:
Health Hazard Assessment for the Personal Hygiene Body Wipe,

2. Your request for a Health Hazard Assessment for the Personal
Body Wipe was reviewed as a Toxicity Clearance under the
provisions of AR 40-5 (Preventive Medicine). The clearance
(reference 1a) indicates that the body wipe does not have any
anticipated adverse health effects.

3. Your request for a Health Hazard Assessment for the Personal
Body Wipe (reference 1b) is satisfied by this Toxicity Clearance.

4. Point of contact for this headquarters is LTC Welford C.
Roberts, AMCSG-H, DSN 667-0241.

5. AMC -- America's Arsenal for the Brave.

FOR THE COMMANDER:

1 Encl
as

HOWARD A. WIENER, M.D., M.P.H.
Colonel, MC
Command Surgeon

APPENDIX F

COMMERCIAL ITEM DESCRIPTION

COMMERCIAL ITEM DESCRIPTION

The following salient characteristics were forwarded to the General Services Administration (GSA) on 1 August 1994. It was requested that they be incorporated into the Commercial Item Description (CID) A-A-461, Hand Cleaner (Pre-Moistened Paper Towelette In Packet). Modifications of the CID, recommended by Natick to accommodate the salient characteristics of the PHEW, were sent to GSA with the request. They included a title change to "Hand Cleaner and Body Wipe" and addition of the PHEW as a type 3 item.

The PHEW will contain a formulation common to baby wipes and will be a commercially available, off the shelf item. The formulation selected was based on in-house technical user tests which evaluated the cleansing effectiveness of several towelettes representative of the commercial market (see appendix H). Cleansing effectiveness was based on the removal of a test soil consisting of a paste made with charcoal and mineral oil, in accordance with CID A-A-461A.

A SEP design review decision was made to provide the soldier with a resealable package containing 12 towelettes. MANPRINT instructions, list of ingredients and other information required by regulatory agencies will be include on the package. A MANPRINT review determined that the package of 12 towelettes (12 pack) should be configured so that it will fit into the smallest pocket of the standard battledress. Therefore, the size of the package shall not exceed 7.5"W by 4.5"L and thickness shall not exceed 2-1/4."

COMMERCIAL ITEM DESCRIPTION

PERSONAL HYGIENE BODY WIPE (PRE-MOISTENED PAPER TOWELETTE IN A PACKET)

Salient characteristics:

The wet paper towelettes are intended to be used in removing ordinary soil from all body skin surfaces without using soap and water. The product will not have an objectionable odor. Twelve towelettes will be packed in a resealable packet, sealed in accordance with commercial practice.

Paper: Towelettes shall be made of white, high strength paper having a minimum basis weight of 51 to 55 grams/square yard. Paper shall consist of cellulose, polyester, or a blend consisting of cellulose and a minimum of 15% polyester. Wet strength shall be a minimum of 0.92 pounds in the transverse direction and 1.15 pounds in the machine direction.

Dimensions: The open towelette shall measure no less than 7 inches (17.78 cm) x 8.5 inches (21.59 cm).

Cleansing solution: The cleansing solution shall comply with the Consumer Products Safety Act and shall not be hazardous or toxic under normal conditions of use. It will be alcohol free and hypoallergenic. The ingredients shall include the following:

Moisturizers.....	Water and propylene glycol
Soothing agent and skin softeners.....	Peg-75 lanolin, aloe vera gel
Cleansing agent	Cocoamphodiacetate
Preservatives.....	All, or any suitable and effective combination of polysorbate 20, methylparaben, propylparaben, disodium phosphate, potassium sorbate, DMDM hydantoin, citric acid, disodium EDTA, trisodium EDTA, bronopol (2-bromo-2-nitropropane-1, 3-diol)
Pleasing odor	Adult Fragrance

pH: The extracted cleansing solution at 25° C shall be 5.0 to 9.0 pH units when tested in accordance with ASTM E 70.

Weight and volume of cleansing solution per towelette: Each towelette inserted into the packet shall be saturated with the cleansing solution. The towelette shall contain a minimum volume of 74 mL and a minimum weight of 75 grams of cleaning solution. (see A-A-461A for procedure to insert). The towel must not be dripping wet.

Cleaning performance: Insert procedure as per A-A-461A.

Preservation, packaging, packing, labeling, and marking. The preservation, packaging, packing, labeling, and marking shall be specified in the contract or order.

NOTE: This draft dated September 21, 1994, prepared by Paints and Chemicals Commodity Center, has not been approved and is subject to modification. DO NOT USE FOR ACQUISITION PURPOSES.

A-A-461B
Proposed
Superseding
A-A-461A
August 13, 1987

draft
COMMERCIAL ITEM DESCRIPTION

HAND CLEANER AND BODY WIPE (PRE-MOISTENED PAPER TOWELETTE IN PACKET)

The General Services Administration has authorized the use of this Commercial Item Description, for all federal agencies.

Type I	-Hand Cleaner	-Regular
Type II	-Hand Cleaner	-Unscented and water based
Type III	-Body Wipe	-Adult fragrance

1. Salient Characteristics. The wet paper towelettes are intended to be used in removing ordinary soils from hands, face, and body without using soap and water. The product shall be free of any objectionable odor. Each towelette for type I and II hand cleaner shall be neatly packed in a packet. Twelve towelettes of type III body wipes shall be neatly packed in a resealable packet so one towel at a time can be removed, and the packet resealed in accordance with commercial practice.

1.1 Paper.

1.1.1 Type I and II hand cleaner towelettes shall be made of white, high-wet strength, creped paper having a basis weight of 25 +/- 1 pound (24 by 36 - 500), in the creped condition, when tested in accordance with TAPPI Method T 410.

1.1.2 Type III body wipe towelettes shall be made of white, high strength paper having a minimum basis weight of 51 to 55 grams/square yard. Paper shall consist of cellulose, polyester, or a blend consisting of cellulose and a minimum of 15% polyester. Wet strength shall be a minimum of 0.92 pounds in the transverse direction and 1.15 pounds in the machine direction.

1.2 Dimensions. The open type I and type II towelette shall measure no less than 12.5 cm (5 inches) by 20.0 cm (8 inches), and the type III towelette shall measure no less than 17.8 cm (7 inches) by 21.6 cm (8.5 inches).

1.3 Cleansing solution. The cleansing solution shall comply with the Consumer Products Safety Act and shall not be hazardous or toxic under normal conditions of use. The solution for type I may be mildly scented. The type II shall be unscented and water based. The solution for type III shall be alcohol free and hypo-allergenic. The ingredients for type III body wipe solution shall include the following:

Beneficial comments, recommendations, additions, deletions, clarifications, etc., and any data which may improve this document should be sent to: GSA, Paints and Chemicals Commodity Center, 400 15th Street, S.W., Auburn, WA 98001.

DISTRIBUTION STATEMENT: Approved for public release.
Distribution is unlimited.

FSC 8520

Moisturizers	Water and propylene glycol
Soothing agent and skin softeners	PEG-75 lanolin, aloe vera gel
Cleansing agent	Cocoamphodiacetate
Preservatives	All, or any suitable and effective combination of polysorbate 20, methylparaben, propylparaben, disodium phosphate, potassium sorbate, DMDM hydantoin, citric acid, disodium EDTA, trisodium EDTA, bronopol (2-Bromo-2-Nitropropane-1, 3-Diol)

1.4 pH. The extracted cleansing solution at 25° C shall be 5.0 to 9.0 pH units when tested in accordance with ASTM E 70.

1.5 Specific gravity. At 25° C, the cleansing solution for type I and type II shall have a specific gravity of 0.970 to 0.995 when tested in accordance with ASTM D 1217.

1.6 Weight of cleansing solution per towelette. For type I and II, each towelette, after insertion into the envelope, shall be saturated with the cleansing solution. The towelette shall have 2.8 to 4.0 grams solution. For type III, each towelette inserted into the packet shall be saturated with the cleansing solution. The towelette shall contain a minimum volume of 74 mL and a minimum weight of 75 grams of cleaning solution when tested as follows (The towelette must not be dripping wet.):

1.6.1 Record the averaged weight of 3 unopened packets weighed to the nearest 0.1 gram. Slit open one side of each packet, remove towelettes, unfold and identify each towelette and envelope. Dry envelopes and towelettes, for 2 hours, in a forced air convection oven maintained at 105° +/- 2° C. Replace each towelette in its original envelope, cool in a desiccator and weigh to the nearest 0.1 gram. Determine the weight loss for each packet and record the average of the 3 losses as the weight of the cleansing solution per towelette.

1.7 Cleaning performance. The wet towelettes shall not shred or pill, shall not cause irritation to skin, and shall be capable of completely removing the test soil from palm of hand, except for soil in creases of the skin.

1.7.1 Preparation of test soil. Mix 3.6 grams of charcoal, airfloat grade, and and 6.4 grams of mineral oil to form a smooth, uniform paste.

1.7.2 Procedure. Apply approximately 0.1 gram of soiling mixture to the palm of one hand. With one finger of the other hand, uniformly rub the soiling mixture into the skin for 1 minute. Keep the soiled area confined to the palm of the hand. Wipe the soiled palm of the hand with both sides of three test towelettes for not longer than 2 minutes. The test towelettes shall be capable of completely removing the test soil from the palm of the hand, except for soil embedded in creases of the skin. In addition, after cleansing and drying, the hand shall be free from any visible or sticky residue of nonvolatile matter left by the cleansing solution.

1.8 Regulatory requirements. The offeror/contractor is encouraged to use recovered material in accordance with Public Law 94-580, as amended, to the maximum extent practical.

1.9 Label for Type III. A pressure sensitive, resealable label shall be applied so that the wipes can be removed one at a time and the package can be resealed. At a minimum, the label shall identify the product and indicate that it shall be resealable. Inclusion of additional information on the label will depend on the size of the label included at the discretion of the manufacturer.

1.10 Instructions for use. The resealable packet shall contain a label with the following instructions:

INSTRUCTIONS FOR USE

1. TO OPEN, PEEL BACK RESEALABLE LABEL
2. REMOVE TOWELETTES AS NEEDED AND RESEAL LABEL
3. WIPE OR SCRUB BODY SURFACES TO BE CLEANSED
4. AIR DRY
5. DISPOSE OF USED TOWELETTES PROPERLY

NOTE: TOWELETTE IS SAFE FOR ALL SKIN SURFACES

1.11 Packet size for Type III. The size of the type III resealable packet shall not exceed 4-1/2 inches wide by 8-inches long , and the packet thickness shall not exceed 2-1/4 inches.

1.12 Preservation, packing, labeling, and marking. The preservation, packing, labeling, and marking shall be as specified in the contract or order.

1.13 The issue of ASTM E 70, ASTM D 1217, and TAPPI T 410, in effect on the date of the solicitation, shall be used to determine compliance with stated requirements.

1.14 ASTM standards are available from the American Society for Testing Materials, 1916 Race Street, Philadelphia, PA 19103

1.15 TAPPI standards are available from the Technical Association of the Pulp and Paper Industry, P.O. Box 105113, Atlanta, GA 30348-5113.

MILITARY INTEREST

Army	-GL
Navy	-SA
Air Force	-99

CIVIL AGENCY COORDINATING ACTIVITIES:

Preparing Activity

GSA - FSS

APPENDIX G

TECHNICAL USER TEST

A TECHNICAL USER TEST
of
THE INDIVIDUAL BODY WIPE

1 February 1994

by

Mark J. Buller
GEO-CENTERS, INC.

PREPARED FOR:

BEHAVIORAL SCIENCES DIVISION

U.S. ARMY NATICK RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

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Executive Summary

Fourteen civilian subjects took part in a pilot study of seven commercially available off-the-shelf cleansing towelettes. The cleansing towelettes or wipes were evaluated in three main areas: cleansing effectiveness, physical attributes, and the effect they had upon the user. Wipes 1, 2 and 4 were selected as candidates for future field testing.

Method

A repeated measures design was used, where each subject tested each wipe. One gram of "Soil" (a mixture of 3.6g of charcoal and 6.4g of mineral oil) was applied to the subject's palm of their hand for one minute and then wiped clean. A wipe characteristics questionnaire was used to obtain data on the wipes physical characteristics and the effect they had upon the user. A wipe comparison questionnaire was used to compare all seven wipes.

Results

Cleansing Effectiveness: Cleansing towelettes 1, 2 and 4 were significantly more effective at cleaning the user's palms than the other four, on three measures: time to clean, number of wipes used to clean, and the subjects' ratings of cleansing ability.

Physical Attributes: In general, the ratings of physical attributes were similar for the towelettes tested. There was a small but significant difference between wipes 1, 2 and 6 and wipe 5 on both the smell and wetness/dryness feel ratings. Wipe 5 was rated as slightly bad for these attributes as compared to wipes 1, 2 and 6 which tended to be rated as slightly good.

Effect upon the User: No significant adverse effects from the wipes were observed, with over 93% of respondents saying that they felt no irritation at all. Wipes 1 and 2 were found to be significantly better at soothing and refreshing.

Conclusions

Cleansing towelettes 1, 2 and 4 are recommended to be selected for future field study candidates.

Individual Body Wipe Pilot Evaluation

Final Report

Introduction

Current military doctrine requires a soldier to take a shower at least once every seven days to maintain health standards. During extensive field operations, soldiers may go without a shower for several days due to a lack of water or shower facilities. As part of the Soldier Enhancement Program (SEP), Natick RD&E Center introduced an individual body wipe concept to be used by soldiers in the field to maintain personal hygiene. Seven types of commercially available cleansing towelettes were evaluated in a preliminary in-house test. The seven wipes were: Texwipe formula 127, Texwipe formula 127 with alcohol added, Presto Baby Cleanups, Presto Baby Wipes, Presto Natural Formula Baby Wipes, Texwipe Clean and Safe, and Vionex.

Method

Subjects

Nine females and five male civilian Natick employees served as test participants.

Equipment

The equipment used included a supply of the seven types of cleansing wipes (See Appendix F). The wipes were unmarked except for an identification number written on the packaging. An agent was used to soil the test participants hands. This consisted of 3.6g of charcoal and 6.4g of mineral oil mixed to a smooth uniform paste. (CID A-A-461A AND Fed Spec UU-T-1790 Cancelled). Questionnaires were used to rate each of the individual wipes on the test criteria. (See Appendix A). Wipe comparison questionnaires were used to rank all seven wipes in terms of user preference. (See Appendix B). Subjects wore a lab coat or smock, to protect their clothes from dirt. A hand held stop watch was used for timing subjects.

Design

A repeated measures design was used. The dependent variable was type of cleansing wipe (See Appendix F); seven commercial off the shelf items were tested. Each participant evaluated all seven

candidates. The repeated measures design was chosen so that fewer test participants were needed and to enable a valid comparison between the wipes, allowing each subject to rank each wipe in comparison with the others.

The order of presentation of conditions for each subject was counterbalanced. The counterbalancing of conditions was necessary to guard against (as far as possible) the repeated effects of washing hands and then using a new wipe.

The test items were evaluated using the criteria: effectiveness to clean, physical attributes, and effect upon the user. These criteria were addressed as follows:

The relative cleansing effectiveness of each wipe was measured by the time taken to clean a subject's hand. A wipe was deemed to have insufficient cleansing effectiveness if a subject's hand remained soiled (except for soil in the creases of the skin) after two minutes of use. After two minutes, if necessary, further wipes could be used. The number of further wipes was noted giving a second measure of cleansing effectiveness.

The physical qualities of each wipe were examined by four factors: smell, color, feel, and durability. Questionnaires were used to measure these factors. Smell was evaluated both in terms of desirability, and whether a wipe of a certain smell would be used over the whole body. Color was measured in terms of desirability. The "feel" factor revealed any negative attributes of the wipes. For example, was the wipe too greasy? Was the wipe too wet? Was the wipe too sticky? Durability addresses whether the wipes material was actually strong enough to accomplish the task of cleaning.

Finally each wipe was evaluated on it's effects upon the user. Specifically: Were the wipes soothing to the hands? Did the wipes cause the skin of the hands to dry? Did the wipes leave any residue? Again these measures were collected by means of a questionnaire.

In addition to evaluating each wipe, all individual wipes were compared to each other by means of a comparison questionnaire. This questionnaire ranked each wipe in terms of user preference, suitability to be used over the whole body and perceived effectiveness in cleaning.

The size of the wipe was addressed only in a secondary manner in this experiment. The size and dimensions of each baby wipe were recorded (See Appendix F) and a question asked if the size needs to be altered for use over the whole body.

Participant Safety

The safety of test participants within this study was important. Safety considerations were an integral part in the design of this experiment and are as follows:

- 1) The products which were evaluated are all commercially available and as such have undergone rigorous testing for consumer safety.
- 2) Prior to accepting any person as a test participant their hands were examined for cuts or abrasions. Any person having a cut or abrasion was not allowed to participate. This was to avoid possible infection.
- 3) Prior to accepting any person as a test participant they were asked whether they have any allergies, hypersensitivities, or reactions to any of the ingredients in the wipes and the soil mixture. In the event of a person being allergic etc. to any ingredient, they would have been excluded from the study.
- 4) Each subject received an individual sample of soil for each experimental condition.
- 5) Waste wipes and soil containers were disposed of after a subject had finished the experiment, into a trash bin, which was provided.
- 6) Soap and water were available for test participants to wash their hands.
- 7) Any spillages of soil etc. were cleaned up immediately.
- 8) All participants were told that they may stop participating at any time.

Procedure

Each subject had their hands examined for cuts and abrasions and was asked if they had any allergies to the ingredients in the wipes or the soil mixture.

Each subject at the start of the study was asked to read the experiment's description and purpose and to sign a copy stating that they were voluntarily participating in this study with the option of withdrawing from the study at any time. (See Appendix D).

The order of condition presentation for each subject was determined by a Latin square (See Appendix C).

Each condition followed the same procedure. The experimenter measured 0.1g of soil onto a paper square. The subject was asked to rub the soil from the paper onto the palm of their hand and to continue rubbing for one minute. The subject was supplied with a wipe and asked to remove the soil using both sides of the wipe. The time taken from when the subject started to use the wipe until their hand was clean was taken. Further wipes were given to the subject after two minutes of cleaning had elapsed, if needed. The total number of wipes used was noted. The subject was then presented with a wipe characteristics questionnaire and asked to answer each question. (See Appendix A). The subject was asked to wash their hands with soap and water. This procedure was repeated until all seven conditions had been completed.

At the end of the seventh condition a subject was given a wipe comparison questionnaire (See Appendix B), and asked to answer all of the questions. After each wipe was used, it was placed aside and numbered so that a subject had all seven wipes in view when completing this questionnaire. The testing and evaluation for each subject for all seven wipes took no longer than one hour.

Results

Cleansing Effectiveness

Three measures of cleansing effectiveness were used: the time taken to clean a subject's hand; the number of wipes used to clean a subject's hand and the cleansing effectiveness rating obtained from the wipe characteristics questionnaire. If a subject needed to use more than one wipe or took more than two minutes to clean their hands, their time was recorded as 120 seconds.

A one way analysis of variance (ANOVA) was carried out for each of the three measures to test for significantly different mean scores between the wipes. For all three measures significant differences were found between the means. To identify which means differed from which, a Tukey post-hoc analysis was conducted for each of the three tasks. The results from these analysis and the mean scores for each wipe are shown in charts 1-3.

CHART 1

Comparison of Time Taken to Clean Hands

$F=8.777$ $df=6, 91$ $P<0.000$

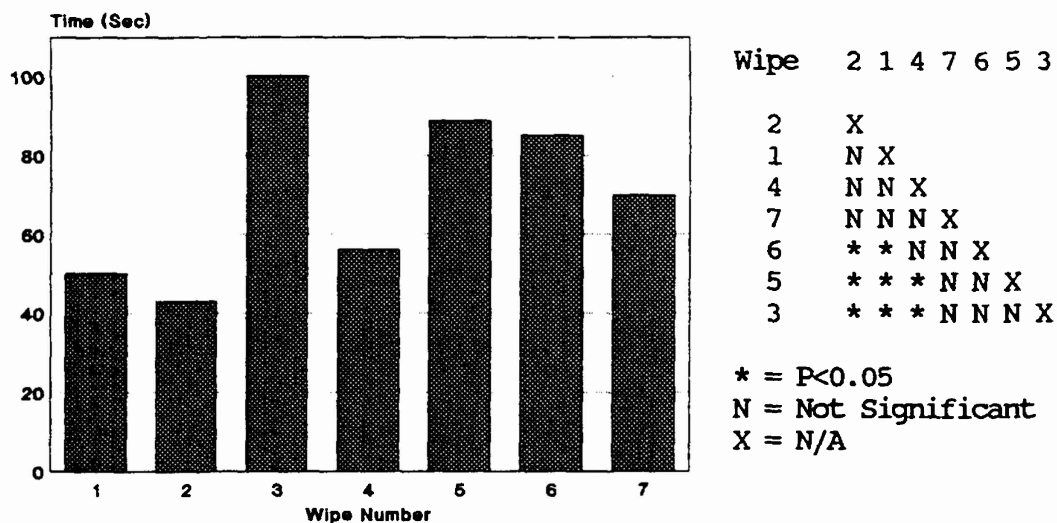
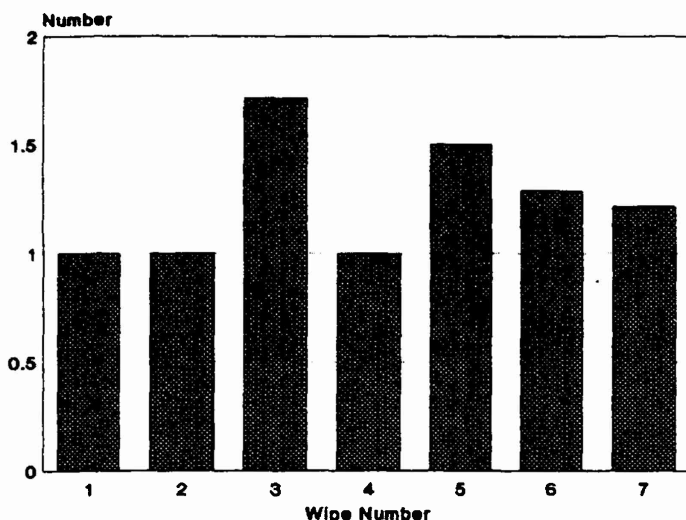


Chart 1 shows that wipe 1 and 2 have significantly better cleaning time scores than wipes 3, 5, and 6. Wipe 4 also has a significantly better cleaning time than wipes 5 and 3.

CHART 2

Comparison of the Number of Wipes Used to Clean a Subject's Hand

F=7.321 df=6, 91 P<0.000



Wipe 1 2 4 7 6 5 3

1	X
2	N X
4	N N X
7	N N N X
6	N N N N X
5	* * * N N X
3	* * * * N N X

* = P<0.05

N = Not Significant

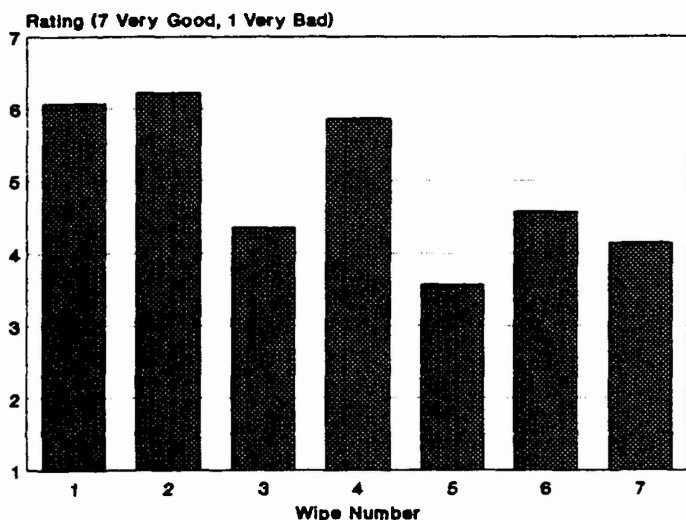
X = N/A

Chart 2 indicates that wipes 1, 2, and 4 take significantly less wipes to clean than wipes 5 and 3. Wipe 7 also takes significantly less wipes to clean than wipe 3.

CHART 3

Comparison of Questionnaire Rating of Cleansing Effectiveness

F=9.595 df=6, 91 P<0.000



Wipe 5 7 3 6 4 1 2

5	X
7	N X
3	N N X
6	N N N X
4	* * * N X
1	* * * * N X
2	* * * * N N X

* = P<0.05

N = Not Significant

X = N/A

From chart 3 it can be seen that wipes 1 and 2 are rated significantly better in their cleansing effectiveness than wipes 3, 5, 6 and 7. Wipe 4 is rated significantly better in it's cleansing effectiveness than wipes 3, 5, and 6.

Physical Attributes

The physical qualities of each wipe were examined by four factors: smell, color, feel and durability.

Color was rated by subjects for each of the wipes, giving a mean rating overall of 4.94 (SD = 1.43) suggesting that on the whole, color for all the wipes was viewed as slightly good. An ANOVA indicated that there was no significant difference between mean ratings for each of the wipes. ($F=0.356$; $df=6, 91$; $P<0.905$).

Durability was a simple yes/no question as to whether the material of the wipes was strong enough to accomplish it's task. Overall 93% of subjects responded that the wipes were strong enough to accomplish the task of cleaning. A Chi Square test was used to test for any significant differences between responses for the wipes. None was found. (Pearson Chi-Square = 8.616, $df = 6$, $P<0.196$).

Smell was rated in the same way as color. An ANOVA revealed that there was a significant difference between the wipe's rating scores. A Tukey post-hoc test was used to distinguish which scores differed significantly. (TABLE 1).

TABLE 1
ANOVA / Tukey Analysis of Means of Smell Rating.

$F=3.355$ $df=6, 91$ $P<0.005$

Mean	SD	Wipe	5	3	4	7	6	2	1
3.000	1.188	5	X						
3.929	1.188	3	N	X					
3.929	1.414	4	N	N	X				
4.214	1.151	7	N	N	N	X			
4.643	1.027	6	*	N	N	N	X		
4.714	1.177	2	*	N	N	N	N	X	
4.929	1.207	1	*	N	N	N	N	N	X

* = $P<0.05$

N = Not Significant

X = N/A

Table 1 indicates that wipe 5 (rated 3.000 Slightly Bad) has a significantly poorer smell than wipes 1, 2 and 6 whose ratings tend to 5 (slightly good.)

A further question regarding smell dealt with whether the smell would prevent the use of the wipe over the whole body. A Chi Square test was used to compare the distribution of responses. No significant difference was found between wipes. However as this result is close to the significance level of $P < 0.05$ the results were examined and are displayed in the following table (TABLE 2).

TABLE 2

Would the Smell of the Wipe Prevent You From Using it Over Your Whole Body?

Response	Wipe	1	2	3	4	5	6	7
No		13	13	12	11	8	13	13
Yes		1	1	2	3	6	1	1

Pearson Chi-square = 11.492 df = 6 $P < 0.074$

Table 2 would suggest that there is a trend towards wipe 5 being rejected for use over the whole body by almost 50 % of the subjects (42.857%).

The criteria Feel had three measures on the questionnaire. The overall mean rating for greasiness was 4.86 (tending towards a rating of slightly good). An ANOVA was used to look for any differences between the mean ratings of each wipe. No significant differences were found between scores. ($F = 1.439$; $df = 6, 91$; $P < 0.209$).

The ratings for stickiness were compared using an ANOVA, no significant difference was found between the scores. (TABLE 3). However the F value was close to the 0.05 significance criteria, suggesting that there may be a trend to a difference in scores between some wipes. An examination of the means (TABLE 3) would suggest wipes 3 and 4 are tending towards a significant difference as compared to wipe 6.

TABLE 3

Stickiness Rating

$F = 2.173$ $df = 6, 91$ $P < 0.053$

Wipe Number	Mean	SD
1	4.286	1.684
2	4.846	1.345
3	3.857	1.232
4	3.857	1.351
5	4.286	1.069
6	5.071	1.385
7	5.000	0.961

The ratings for wetness were compared using an ANOVA. A significant difference was found between the wetness scores. (TABLE 4). A Tukey post-hoc analysis was used to identify which scores differed.

TABLE 4
ANOVA / Tukey Analysis of Means of Wetness Rating.

F=3.605 df=6, 91 P<0.003

Mean	SD	Wipe	Wipe	5	3	7	4	6	1	2
3.429	1.399	5	5	X						
4.571	0.938	3	3	N	X					
4.786	2.119	7	7	N	N	X				
5.000	1.359	4	4	N	N	N	X			
5.071	1.385	6	6	*	N	N	N	X		
5.286	1.383	1	1	*	N	N	N	N	X	
5.769	1.092	2	2	*	N	N	N	N	N	X

* = P<0.05

N = Not Significant

X = N/A

Table 4 indicates that wipes 1, 2 and 6 are preferred significantly more in terms of the wipes wetness/dryness feel than wipe 5. The wetness of wipe five tends towards the rating 3 (slightly bad) while wipes 1, 2 and 6 are between the ratings of 5 and 6 (slightly good to moderately good).

The Effect of the Wipe upon the User

Five questionnaire questions addressed the area of the effect of the wipe upon the user. (Questions 2a, 2b, 4c, 4d, 4e). In Question 4a, the wipes were rated as to how itchy they made a subject's hand feel. The mean response was 3.969 (rated not itchy at all). An ANOVA was used to look for any significant differences between wipe ratings. No significant differences were found. (F=0.667 df=6, 91 P<0.677).

Question 4d addressed whether the wipes caused any other kind of irritation. 93.9% of responses said that there was no irritation caused by the wipe. A Chi square analysis revealed no significant difference between responses of the different wipes. (Pearson Chi-Square = 3.551 df = 6 P<0.737).

Question 4e asked if the wipes left any kind of sticky or greasy residue. A Chi Square analysis revealed that there was a difference between the responses of the different wipes. (TABLE 5).

TABLE 5

Does the wipe leave any kind of sticky or greasy residue?

Pearson Chi-Square = 27.191 df = 6 $P < 0.000$

	Wipe 1 %	2 %	3 %	4 %	5 %	6 %	7 %
Response:							
No	10 71.4	9 64.3	5 35.7	4 28.6	12 85.7	14 100	12 85.7
Yes	4 28.6	5 35.7	9 64.3	10 71.4	2 14.3	0 0	2 14.3

Table 5 indicates that both wipe 3 and 4 were recorded most often as leaving a sticky or greasy residue. Wipes 1 and 2 also give an indication that about one third of the respondents stated that a greasy or sticky residue was left on their hands.

Question 2a and 2b asked how soothing and how refreshing the wipes were to the subject's hands, respectively. An ANOVA revealed that in both questions there was a significant difference between the wipe's rating scores. (TABLE 6). A Tukey post-hoc analysis revealed that for the soothing measure wipe 1 was rated significantly higher than wipes 5 and 3. Wipe 2 was rated significantly higher than wipe 5.

TABLE 6

Mean Scores for Soothing and Refreshing Measures

Soothing:

Wipe	Mean	SD	F	df	P
1	5.500	0.941	4.167	6, 91	<0.001
2	5.429	1.090			
3	4.286	0.995			
4	4.714	1.139			
5	4.000	0.961			
6	4.714	0.914			
7	4.429	1.158			

Refreshing:

Wipe	Mean	SD	F	df	P
1	5.429	0.852	2.768	6, 91	<0.016
2	5.643	0.929			
3	4.643	1.008			
4	4.786	1.311			
5	4.286	0.995			
6	4.857	1.027			
7	4.643	1.277			

For question 2b the Tukey analysis revealed that wipe 2 was rated significantly higher than wipe 5.

Wipe Comparison Questionnaire

The ranked position of each wipe for each question on the wipe comparison questionnaire was calculated. (See Table 7). Note that on subject's questionnaire, the wipe number that is used is actually the wipe presentation order. i.e. the figure one in the raw data is the first wipe presented to the subject. The figure two in the raw data is the second wipe presented to the subject, and so on. To match these numbers with the actual assigned wipe number reference must be made to the Latin Square which determined presentation order for each subject. (Appendix C).

TABLE 7
Mean Rank Positions from the Wipe Comparison Questionnaire

Question	Rank	Wipe #	Mean	SD
Most Liked	1	2	1.93	1.07
	2	1	2.50	1.61
	3	4	4.07	1.59
	4	6	4.29	1.68
	5	7	4.86	2.35
	6	5	5.07	1.77
	7	3	5.29	1.20
Most Suited to use over Whole Body	1	2	1.86	0.95
	2	1	2.07	1.38
	3	6	4.36	1.34
	4	4	4.71	1.64
	5	5	4.86	1.99
	6	7	4.93	2.13
	7	3	5.21	1.19
Most Effective at Cleaning	1	2	1.79	0.80
	2	1	2.07	0.83
	3	4	3.79	1.81
	4	6	4.86	1.35
	5	7	4.93	2.27
	6	5	5.14	1.75
	7	3	5.43	0.94

Wipes 2 and 1 are consistently ranked 1st and 2nd (respectively). Wipe 4 is ranked 3rd twice for the most liked wipe and for the wipe seen as most effective in cleaning. For the wipe thought to be most suited for use over the whole body, wipe 6 is ranked 3rd with wipe 4 being ranked fourth.

Discussion

The purpose of this study was to identify one or two wipe candidates to be evaluated in more extensive field testing. Each of the wipes were evaluated in terms of three criteria: A wipe's cleansing effectiveness, a wipe's physical attributes and the effect a wipe has upon a user.

Cleansing Effectiveness

Of the three measures used to evaluate cleansing effectiveness each one successively narrowed down the field of candidates. With wipes 1, 2, and 4 all subjects only used one wipe to clean their hand. However subjects using wipes 5 and 3 tended to use more than one wipe. The ANOVA and post-hoc Tukey test (CHART 2) revealed that the number of wipes used by subjects to clean their hands for wipes 1, 2, and 4 differed significantly from the number used with wipes 5 and 3. Thus wipes five and three are rejected in terms of being less efficient in cleaning than wipes 1, 2 and 4. Wipes 5, and 3 are also rejected because in general more than one wipe was needed to clean a subject's hand.

The time taken by subjects to clean their hand narrows down the field of wipes further. From the ANOVA and subsequent Tukey Post-hoc test (CHART 1) wipes 1, and 2 are shown to cleanse in a faster time than wipes 3, 5, and 6. Thus in terms of time to clean a subject's hand wipe 6 can also be rejected as being less effective.

From the questionnaire subjects rated the wipes in terms of their cleansing effectiveness. The ANOVA and subsequent post-hoc Tukey test (CHART 3) revealed wipes 1 and 2 are rated significantly higher than wipes 3, 5, 6 and 7. Thus wipe 7 can be rejected.

From these three measures of cleansing effectiveness three wipes emerge as possible candidates for future examination, wipes 1, 2 and 4.

Physical Attributes

The measures of physical attributes were smell, color, feel, and durability. Both color and durability were not significantly different between the wipes.

The measures for smell (Table 1) identified that wipe 5 was rated as having a slightly bad smell and was significantly different from wipes 1, 2 and 6 whose ratings tended towards having a slightly good smell. The question "Would the smell of the wipe prevent you from using it over your whole body?", revealed that almost 50% (42.9%, 6/14) of the subjects would not use wipe 5 because of it's smell. (See Table 2). Thus, wipe 5 can be rejected because of an unacceptable smell.

The attribute of feel of the wipe was broken into three measures. For the measure of greasiness, no significant difference was shown between the rating scores. Stickiness gave no significant difference between the wipes except for a trend towards the scores for wipes 3 and 4 being different from wipe 6. However, this trend cannot be used as a basis for rejecting any of the wipes on physical grounds as the difference would be between a rating tending towards neither good nor bad and slightly good.

The wetness measure identified wipe 5 as tending towards a slightly bad feel when used. This was significantly different from wipes 1, 2, and 6 (Table 4). Comments from questionnaire items 5, 6 and 7 suggest that this wipe is too dry. On these grounds wipe 5 can be rejected as a contender.

The measure of physical attributes provided little differentiation between wipe candidates. As has been noted, wipe five has been rejected. A positive selection of the three best wipes can also be made. In the two measures where ratings proved significant (smell and wetness), the three same wipes, 1, 2 and 6 scored the highest (See Table 1 and 4). It was also these three wipes which were significantly different from the score of wipe 5. Thus wipes 1, 2 and 6 should be selected as the best wipes measured by their physical attributes.

The Effect of the Wipe upon the User

Three areas were examined to measure the effect of the wipes upon the user: whether there was any irritation, whether there was any kind of greasy residue left, and whether the wipes were refreshing or soothing.

Irritation caused by any of the wipes was found to be negligible. 93.4% of all responses of the subjects said that there was no irritation caused by the wipes. Asked to rate the wipes in terms of itchiness there was an overall score of 3.97. A score of 4 indicates that there was no itchiness at all.

Wipes fared differently when measuring whether a greasy or sticky residue was left after using the wipes and significant differences were found between the responses for the different wipes. For wipes 3 and 4, 64.3% and 71.4% of subjects respectively, stated that these wipes left a greasy or sticky residue as compared to wipe 6, where 100% of subjects stated that this wipe did not leave a greasy residue. Although a greasy or sticky residue was left, this does not form grounds to reject either wipe 3 or 4. In looking at the scores for how the subjects found both the greasiness and stickiness of wipes 3 and 4, (TABLE 3) their scores ranged from 3.9 to 4.7. In other words, from neither good nor bad to slightly good. So, although a residue was left this residue was not found to be bothersome. For wipes 1 and 2 subjects reported a sticky or greasy residue one third of the time. This may however be due to lotion in the formula of the

wipe which needs to be rubbed into the hands and again ratings for how the subjects liked or disliked the stickiness or greasiness ranged from 4.3 to 5.0 (neither good nor bad to slightly good).

In terms of a wipes soothing or refreshing ability, all wipes were rated higher than 4.0 (neither good nor bad). However there were significant differences. For soothing, wipes 1 and 2 were rated significantly better than wipes 3 and 5, while for refreshing, wipe 2 was rated significantly better than wipe 5.

The effect the wipes have upon the user varies little between the wipes with no noticeable adverse affects. As with the physical attribute's measures no rejection of any one wipe can be made; but again a positive selection can be made based solely on the greater refreshing and soothing characteristics of wipes 1 and 2.

Conclusion

As has already been stated, the purpose of this study was to identify one or two wipe candidates to be evaluated in field testing. Wipes 1 and 2 clearly can be identified as these two candidates, as they were selected as best by all three of the testing criteria. However wipe 4 should also be considered as a candidate for future testing. The cleansing effectiveness measures eliminated wipes 3, 5, 6, and 7 as these were statistically less effective at cleaning than wipes 1 and 2. Wipe 4, though cannot be statistically differentiated in terms of cleansing effectiveness from wipes 1 and 2. In effect, wipe 4 has a cleansing ability equal to wipes 1 and 2. Considering also that there is very little difference between the wipes on the other two measures (physical attributes, and effect upon the user) (See Appendix G, for a summary chart), there is no reason why wipe 4 should not be added as a third candidate for future field testing.

In further support of wipe 4, it should be noted that wipes 1 and 2 are the largest wipes (See Appendix F) measuring 1 square foot, while wipe 4 measures 0.42 square foot. Wipe 4 then, has less than half of the cleaning area than wipes 1 and 2. To demonstrate the effect of size, wipe 3 is the exact same formula as wipe 4, but only measures 0.28 square foot. Wipe 3 has two thirds the cleaning area of wipe 4 and for each measure of cleansing effectiveness is significantly worse at cleaning than wipe 4. It should be noted that wipe 4 is readily available in an 11" x 9" size (0.69 square foot) which will be available for the field testing.

Wipe Comparison Questionnaire

The wipe comparison questionnaire reinforces the findings of the other measures. Wipes 1, 2, and 4 are ranked as the top three in terms of cleansing effectiveness and as to

which wipes were liked the most. For the concept question as to which wipes would be suited for use over the whole body, wipes 2 and 1 are ranked the most suited with wipe 6 ranked third in this category. This may be due to better performance of wipe 6 in the physical characteristics and effect upon the user measures. It should be noted however that wipe 6 did not perform statistically better on these measures than wipe 4.

In conjunction with the other measures the wipe comparison questionnaire results reinforce the selection of wipes 1, 2, and 4 as future test candidates.

Recommendation

The findings of this pilot evaluation of seven cleansing towelettes are that wipes 1, 2, and 4 should be selected as future field study test candidates.

Appendix A

Wipe Characteristics Questionnaire

Subject Name: _____ Date : _____

Subject # : _____ Wipe #: _____

Condition # : _____

Number of Wipes used to clean hand: _____

Time taken to clean hand : _____

1. Please rate the wipe on how you found each of the following characteristics. Use the scale provided below, circle ONE number for each.

VERY BAD	MODERATELY BAD	SLIGHTLY BAD	NEITHER BAD NOR GOOD	SLIGHTLY GOOD	MODERATELY GOOD	VERY GOOD			
1	2	3	4	5	6	7			
a. Smell?			1	2	3	4	5	6	7
b. Color?			1	2	3	4	5	6	7
c. Greasiness?			1	2	3	4	5	6	7
d. Wetness?			1	2	3	4	5	6	7
e. Stickiness?			1	2	3	4	5	6	7

2. Please rate the wipe on each of the following. Use the scale provided below, circle ONE number for each.

VERY BAD	MODERATELY BAD	SLIGHTLY BAD	NEITHER BAD NOR GOOD	SLIGHTLY GOOD	MODERATELY GOOD	VERY GOOD			
1	2	3	4	5	6	7			
a. How effective was the wipe at Soothing your hands?			1	2	3	4	5	6	7
b. How effective was the wipe at Refreshing your hands?			1	2	3	4	5	6	7
c. How effective was the wipe at Cleaning your hands?			1	2	3	4	5	6	7

3. Please think about the wipe's material.

a. Is the material strong enough to accomplish the task of cleaning your hands?

(YES/NO) _____

If NO, please explain why the material is not strong enough.
(Give any examples of where the material tore etc.)

4. Please think about what effect the wipe had upon your hands.

a. How moist or dry did the wipe make the skin of your hands? Please Circle ONE answer.

- | | |
|--------------------------|-------------------|
| 1. Very Moist | 5. Slightly Dry |
| 2. Moderately Moist | 6. Moderately Dry |
| 3. Slightly Moist | 7. Very Dry |
| 4. Neither Moist nor Dry | |

b. When cleaning your hands how do you prefer your hands to feel? Please circle ONE answer.

1. Moistened
2. Dry
3. Neither Moist. nor Dry

c. Please state how itchy the wipe made your hands feel? Please Circle ONE answer.

1. Very Itchy
2. Moderately Itchy
3. Slightly Itchy
4. Not Itchy at all

d. Does the wipe cause any kind of irritation to your skin?

(YES/NO) _____

If Yes, Please explain. _____

e. Does the wipe leave any kind of sticky or greasy residue?

(YES/NO) _____

If Yes, Please explain. _____

5. Please state whether you would use this wipe over your whole body?

(YES/NO) _____

If NO please explain your reasons. _____

6. Would the smell of this wipe prevent you from using it on your face, or the rest of your body?

(YES/NO) _____

If YES please explain your reasons. _____

7. Please imagine that you have gone without a shower or wash for many days. In this circumstance please state whether you would use this wipe over your whole body?

(YES/NO) _____

If NO please explain your reasons. _____

Appendix B

Wipe Comparison Questionnaire

1. Please rank the seven wipes according to your preference.

_____ Most Liked

_____ Least Liked

2. Please rank the seven wipes according to their suitability to be used over the whole body.

_____ Most Suited

_____ Least Suited

3. Please rank the seven wipes according to their effectiveness to clean.

_____ Most Effective

_____ Least Effective

4. If you were to use the best wipe for your whole body, do any changes need to be made to the design?

(YES/NO) _____

If YES please circle all areas that need to be changed and write what change needs to be made.

Size

Smell

Color

Durability

Wetness

Stickiness

Greasiness

Texture

Appendix C

Latin Square - Condition Order for Subjects

Subject Number	Condition Order
1	1 2 3 4 5 6 7
2	2 3 4 5 6 7 1
3	3 4 5 6 7 1 2
4	4 5 6 7 1 2 3
5	5 6 7 1 2 3 4
6	6 7 1 2 3 4 5
7	7 1 2 3 4 5 6
8	1 2 3 4 5 6 7
9	2 3 4 5 6 7 1
10	3 4 5 6 7 1 2
11	4 5 6 7 1 2 3
12	5 6 7 1 2 3 4
13	6 7 1 2 3 4 5
14	7 1 2 3 4 5 6

Appendix D

Wipe Evaluation Study

This is a study to evaluate seven types of cleansing wipes, for their effectiveness to clean, how they look, feel, smell, etc.. For each wipe in turn you will first be asked to make one hand dirty, using a mixture of mineral oil and charcoal. You will then be asked to clean your hand as quickly as possible using both sides of a wipe. You may ask for further wipes if you feel you need more to get your hand clean. A questionnaire will be given to you asking for your opinion about the wipe which you have just used. After using all seven wipes a further questionnaire will be given to you. This will ask you to rank each of the wipes in order of preference. Please bear in mind as you use each wipe that you will be asked to compare all seven wipes at the end of the study.

Soap and water is provided for you to wash your hands.

Please sign below to indicate that you have read these instructions and agree to participate as a volunteer, being aware that you may cease to participate, for whatever reason at any time.

Signature

Date

Appendix E

List of Ingredients in Soil and Wipes

Soil: Charcoal, Mineral Oil

Cleansing Wipes:

Alcohol (SD) 40
Aloe Vera Gel
Benzethonium Chloride
Carboxylate
Citric Acid
Cocooamphodiacetate
Dimethicone Copolyol (Silicone)
Disodium Phosphate
DMDM
Fragrance
Hydanton
Isopropyl c 12-15 Pareth-9
Methylparaben
Nonoxymol-9
Parachlorometaxylenol
Peg-75 Lanolin
Polyparaben
Polysorbate 20
Propylene Glycol
Silicone
Sorbic Acid
Trisodium EDTA
Water

Appendix F

Cleansing Wipes' Experimental Numbers

- 1) 12"*12" TexWipe, Formula 127 1(A) No Alcohol
- 2) 12"*12" TexWipe, Formula 127 1(B) Alcohol Added
- 3) 6"*6.75" Presto Baby Cleanups
- 4) 7.2"*8.3" Presto Baby Wipes
- 5) 7.2"*8.3" Presto Baby Wipes, Natural Formula
- 6) 5"*7" TexWipe, Clean and Safe, Antimicrobial
- 7) 5"*7" Vionex, Antimicrobial.

Appendix G

Comparison Table for Wipes on both the Physical Characteristics and Effect upon the User Measures

	Wipe Number						
	1	2	3	4	5	6	7
<hr/>							
Physical Characteristics							
Durability	+	+	+	+	+	+	+
Smell	++	++	+	+	-	++	+
Color	++	++	++	++	++	++	++
Stickiness	+	++	+	+	+	++	++
Greasiness	++	++	++	++	++	++	++
Wetness	++	+++	++	++	-	++	++
<hr/>							
Effect Upon the User							
Soothing	+++	++	+	++	+	++	+
Refreshing	++	+++	++	++	+	++	++
Itchiness	+	+	+	+	+	+	+
Irritation	+	+	+	+	+	+	+
TOTAL	17	19	14	15	8	17	15

- Slightly Bad ++ Slightly Good
 + Neither Good nor Bad +++ Moderatley Good