

MEMORANDUM

Lyndon B. Johnson Space Center



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TO: AL3/E. K. Fein		CC CB/J. W. Young	
FROM: W. E. Thornton, M.D.		SIGNATURE <i>W. E. Thornton</i> W. E. Thornton, M.D.	

SUBJ: Improved Waste Collection System

After flatly stating that no 1-g applications of the piston-compactor toilet exists, on further rumination there is a potentially valuable medical application both in flight and in 1-g. It is frequently desirable to collect stools or stool samples over a period of time. This device will inherently separate and store such samples which may be unequivocally identified by adding an identifying tag to the waste paper before "flushing" the unit. The device can be weighed before and after each use for absolute mass of each defecation in 1-g or a small mass measuring device added for weightless operations. Other potential 1-g uses would be wherever a small device without water were required.

Since I did not complete the disclosure forms, the following is added for background: This invention began about the third flight day of STS 51-B when some crewmembers were beginning to avoid the toilet, when it became obvious that trash was becoming a problem and when it was well established that even if the urine measuring system could be made to work, it would cause even more problems in flight. It was at this point that I decided someone had to do something about these messes which have real impact on operations. Fairly extensive conversations about these problems, including some potential solutions were carried on with some of the crew and particularly the commander, Col. Overmyer, who had considerable insight into the problem. These problem areas, especially the WCS and trash became worse with mission duration until they posed a health hazard and this hardened my resolve to try to find some solutions. Ideas for improved WCS at that time included a wet "flush" system, a bagging scheme, and mechanical collection and storage. On May 21, I made a verbal request to Mr. Abbey that in addition to other duties, I be allowed to attempt solutions to the problems encountered and he concurred. I had discussed with Mr. Whitmore the fecal/urine collection problem and several solutions which I felt had potential. I was also assigned to the WCS "tiger team" of Mr. Guy which was tasked with improving the WCS situation ASAP. It was on this team that I saw a variety of expensive design studies by major contractors, some using the basic concepts that I considered but not one of which was practical nor that could be practically made. Also at this time, I designed and flew a series of KC-135 studies for improved male urinals. Approximately June 1, Mr. Whitmore was in town on other NASA matters, and we spent some time on details of the various

potential WCS systems and repeated this on June 10. On June 13, we had a long telephone discussion initially involving several systems, and finally I opted for the mechanical piston-compactor if we could put a disposable face on it which Whitmore felt was practical. We then discussed and agreed upon the various design features required for a flight system which was documented (P-6, Thornton notebook, 1985-II) and was disclosed to you. Subsequently, I was able to obtain \$15,000 for Mr. Whitmore to build a demonstration device for the basic concept and this was completed approximately August 1, and we tested and used it at Mr. Whitmore's with feces and simulated feces on August 7. Mr. Whitmore brought this unit to JSC where we first publicly demonstrated it to some members of the Astronaut Office, including Capt. Young and Col. Overmyer, to the WCS committee and to Mr. Colonna and others in the project office on August 12 and 13.

Mr. Whitmore provided some drawings of design concepts for various features of a prototype and copies of this and the basic concept which I had done locally were shown during the demonstration. You have been provided copies of this. There were no other written disclosures. I had discussions of the concept with a number of people in our office before and after a working demonstration.

I have also worked on a number of concepts and some detailed designs for a workable trash compactor for Shuttle and for a urine measuring and sampling system. The former has been discussed jointly with Mr. Whitmore and the second to some extent. I hope to obtain funds to demonstrate prototypes of these items and will probably send you sketches of them for record since considerable resources have been expended unsuccessfully on these items by others.

Comment on piston compactor fecal system: As indicated to you, this was a joint effort of Thornton and Whitmore and not, as has been implied, an idea I found. The effort and many of the concepts were initiated by me and many of the design details as well; however, I could not have brought it to fruition without the contributions of Mr. Whitmore--contributions made without pay before the initial reduction to practice. Conversely, without many of the basic concepts and features which I contributed, the completed idea and hardware would not exist, nor will a successful unit result without my continued inputs. This is a joint invention, with complications sure to result; however, no attempt should be made to fractionate the contributions of both people.