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CATEGORICAL EXCLUSION DETERMINATION THORIUM OVERPACKING AND ONSITE INTERIM STORAGE NEPA DOC. NO. 106

06/17/88

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FMPC

NEPA DOCUMENTATION

COGNIZANT PROJECT ENGINEER: S. W. Heisler, Jr.

PROJECT LOCATION: Plant 9 Warehouse

PROJECT/PROGRAM TITLE: 35-GE (CE) THORIUM METAL OVERPACKING AND ONSITE INTERIM STORAGE (212 DRUMS)

PROJECT COST: $409,375

CONSTRUCTION START DATE: MARCH, 1988

PROJECT/PROGRAM NUMBER: 00-88201

NEPA DOCUMENT NUMBER: 000106

NEPA SUBMITTAL DATE: Revision 2 MAY 30 1988

PROJECT EXECUTIVE SUMMARY

The Feed Materials Production Center (FMPC) is proposing to implement an interim thorium disposition program to provide for the safe storage of 212 drums (containing 241 containers) of thorium materials currently in unprotected outside storage. Twenty one (21) of the 241 containers contain potentially pyrophoric thorium metal fines. The containers are showing signs of environmental deterioration due to years of exposure to the elements from outside storage. Once the deteriorated containers are identified they will be overpacked and placed in interim storage onsite in existing FMPC warehouse storage facilities.

This project is required to ensure the safe storage of the thorium materials and to preclude thorium releases to the environment and the possibility of a thorium metal fines fire.

PROJECT JUSTIFICATION

The proposed interim disposition program for the onsite safe storage of the thorium materials is required to eliminate the possibility of thorium releases to the environment and to preclude the possibility of a thorium metal fines fire due to the current condition of the thorium containers. The implementation of the proposed disposition program will minimize exposure to plant personnel by addressing the existing thorium storage concerns in a single planned effort.

The cumulative impacts of this project have been assessed and it has been determined that this action does not have net adverse environmental impacts. Other options have not been precluded by this action.

EXISTING NEPA DOCUMENTATION/DATE SUBMITTED			
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THIS NEPA DOCUMENT			
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DOE APPROVAL REQUESTED

DOE/FMPC X X

DOE/ORO _____

DOE/HQ _____

COGNIZANT PROJECT ENGINEER/DATE: S. W. Heisler 5/27/88

SITE NEPA COORDINATOR/DATE: Susan Van Dyke 5-31-88

SITE NEPA MANAGER/DATE: C. R. Dam 5/31/88

SITE DOE OFFICER/DATE: Ray Hannon 6/6/88

ADDITIONAL DOE APPROVAL(IF NEEDED) DATE: Carol Borgstrom 6/17/88

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1.0 PURPOSE AND NEED FOR ACTION:

The Feed Materials Production Center (FMPC) site is located in both Hamilton and Butler Counties near Fernald, Ohio, approximately 32 kilometers northwest of Cincinnati, Ohio. (See Figure 1) The FMPC is owned by the United States Department of Energy (DOE) and is managed under contract to the DOE by the Westinghouse Materials Company of Ohio (WMCO). The facility produces uranium metal forms used in the fabrication of fuel and target elements for the DOE defense program.

The FMPC has served as the DOE storage site for thorium materials since 1972. The thorium materials are currently stored in bulk in silo and bins, stored in containers (13,300 containers) in four FMPC warehouse buildings, and a small portion, 212 drums, is stored in outside storage on a concrete pad. (See Figure 2) This NEPA Document addresses the 212 drums in outside storage.

The 212 drums (containing 241 containers) have been in outside storage since the mid-1970s and are showing signs of extensive deterioration due to exposure to the elements. The drums are stored in a horizontal position in three single rows, stacked four drums high. The rows of drums have begun to lean from the deterioration of the drums. The FMPC identification markings, specifying the material description code of the drum contents, are no longer legible on a portion of the drums. The contents of the containers must be identified, the drums must be overpacked and interim onsite storage provided, to ensure the safe storage of the materials and preclude thorium releases to the environment.

Twenty one (21) of the 241 containers contain thorium metal fines that may be pyrophoric. These materials must be inspected and isolated during the identification and overpacking of the thorium materials.

2.0 DESCRIPTION OF THE PROPOSED ACTION:

There are 241 individual containers of thorium materials within the 212 drums. The materials will be identified, overpacked and placed in interim onsite storage until final disposition of the thorium materials is determined and implemented. This will allow for the safe storage of the thorium at the FMPC.

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Figure 1

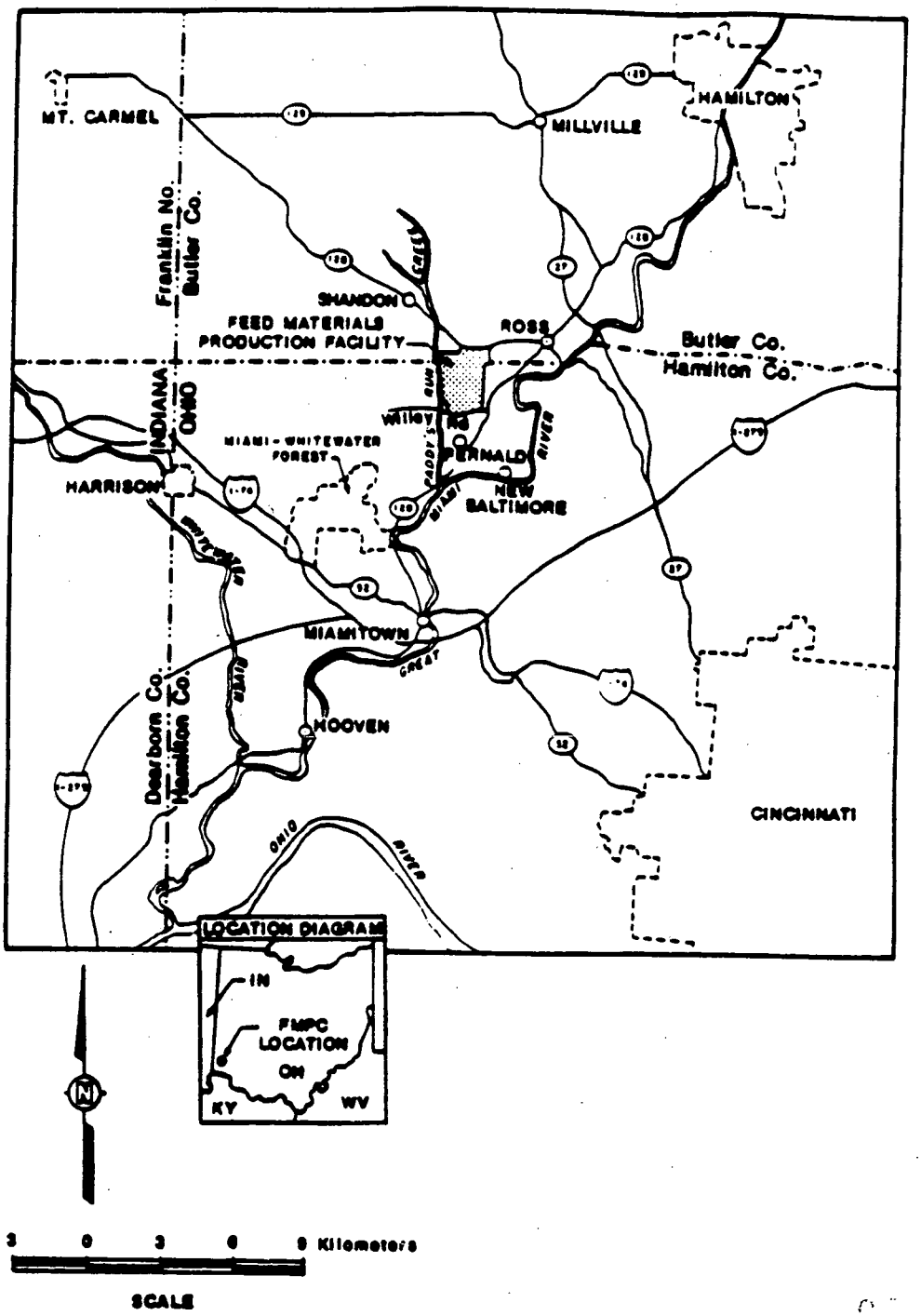

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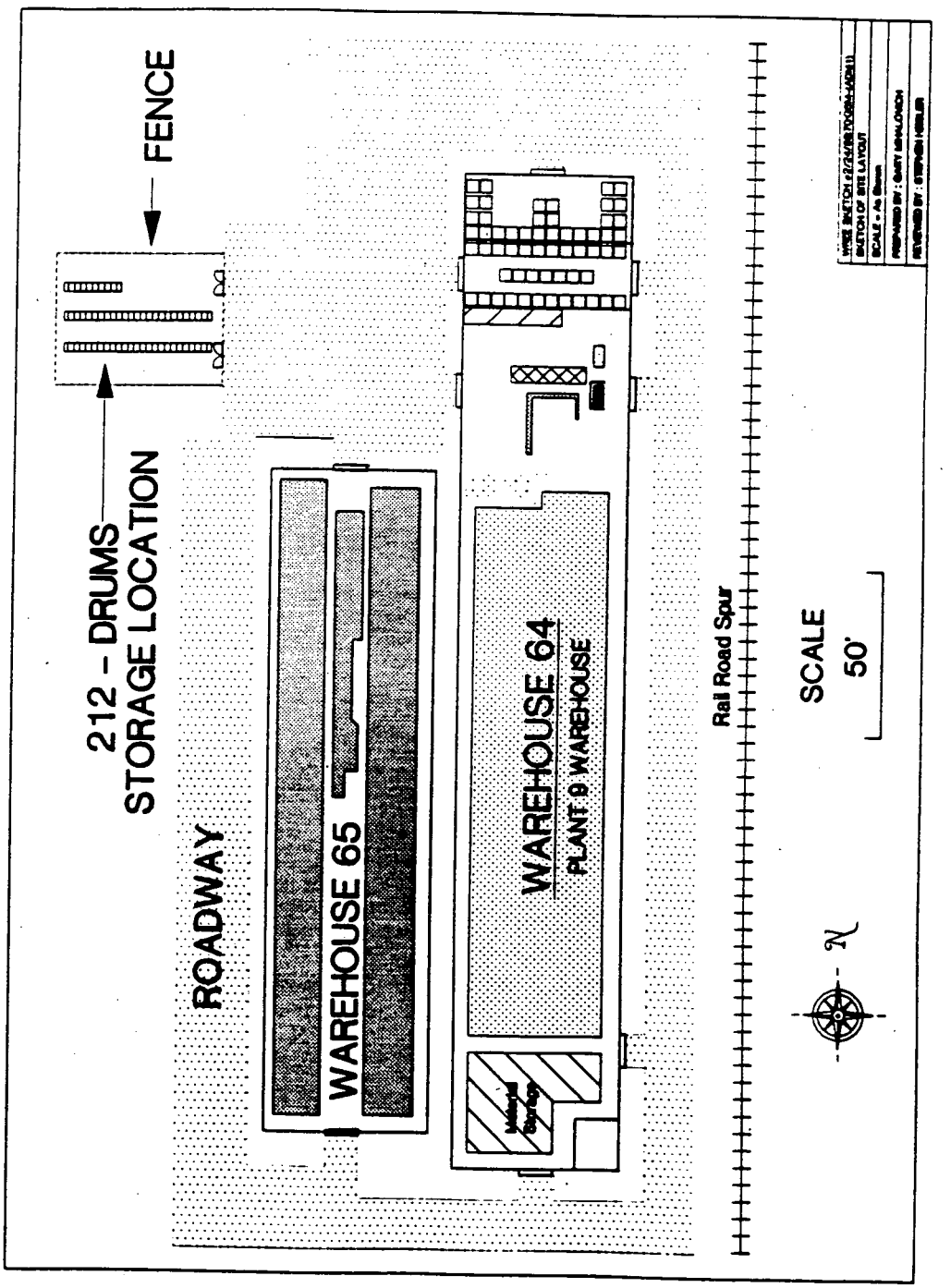
Figure 2



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The first step of the project will be to move each of the individual 212 drums from the outside storage pad into a covered warehouse location using a fork-lift modified for the handling of the thorium containers. The warehouse location will be used for the identification and overpacking of the individual drums. A portion of FMPC Warehouse Building #64 will be utilized as the drum material identification, overpacking and interim onsite storage area. (See Figure 3)

As the individual drums are transported into the warehouse each will be visually inspected for existing FMPC identification markings or codes. These markings and codes will be compared to existing historical inventory information. The identification of the thorium materials will be accomplished through the use of visible container markings and existing historical inventory data supplemented with the additional information to be obtained during the overpacking process.

Immediately after visual examination each deteriorated drum will be placed on a remotely controlled conveyer system to begin the identification and overpacking process. (See Figure 4) The overpacking system will be remotely controlled by operators stationed behind a shielded wall. The conveyer system will have preset stations for the overpacking and weighing of each individual drum.

The conveyer system will also have preset stations to perform a gamma survey of each drum to identify the contents of the container by the gamma field given off by the thorium materials. The gamma survey information will be utilized in conjunction with the container weight, visible container markings and historical inventory information to complete the identification of the contents of the container.

Once the gamma survey is completed the conveyer system will move the container to an alpha swipe survey station to determine the exterior contamination on the new overpack container. Once the alpha survey is complete the overpack drum will be remotely lifted by crane and placed into a multiple overpack (six-pack) container. Once the multiple overpack is filled the interior of the overpack will be foamed to provide additional containment of the materials and to prevent movement of the containers during handling and transportation.

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Figure 3

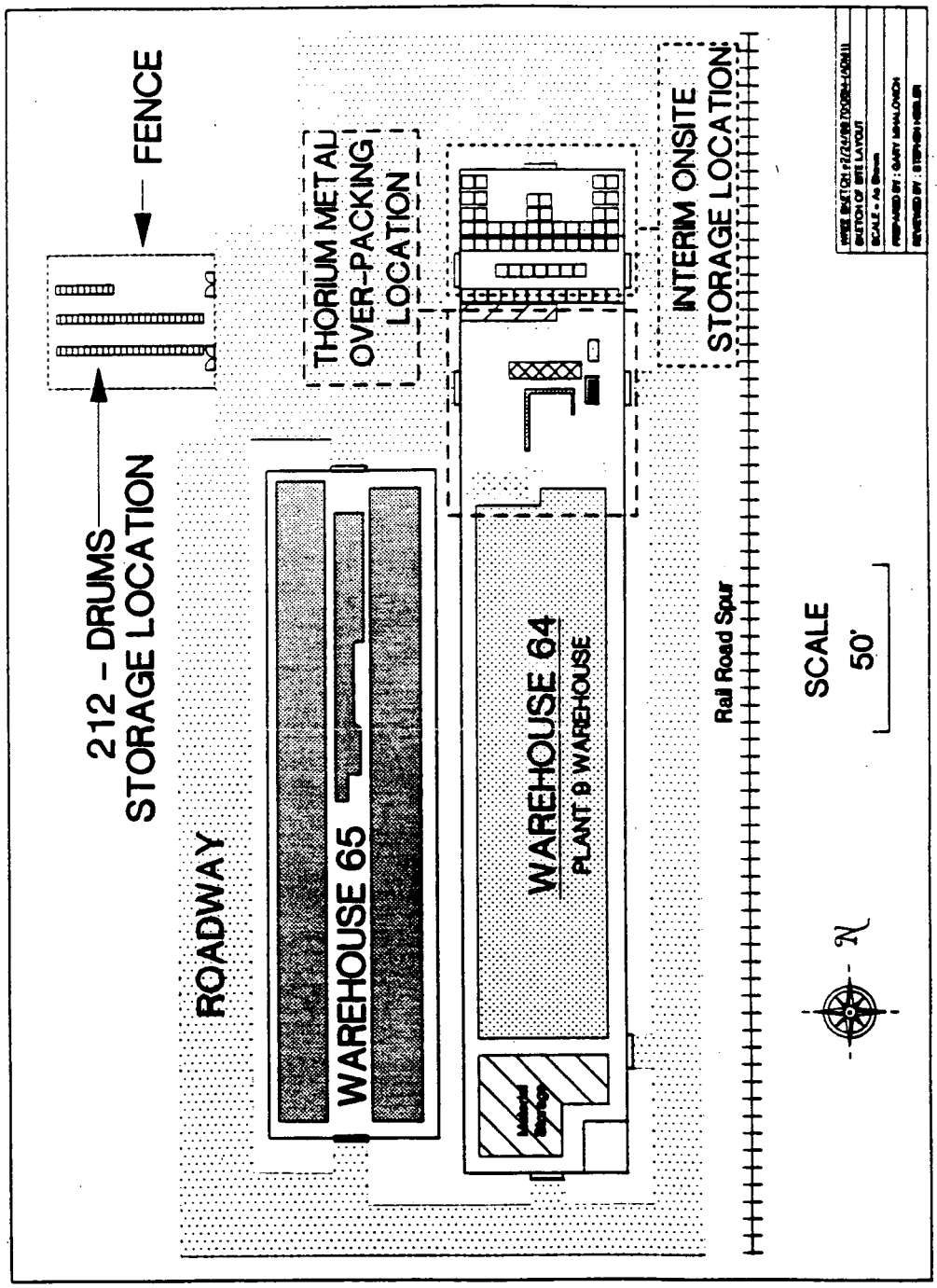

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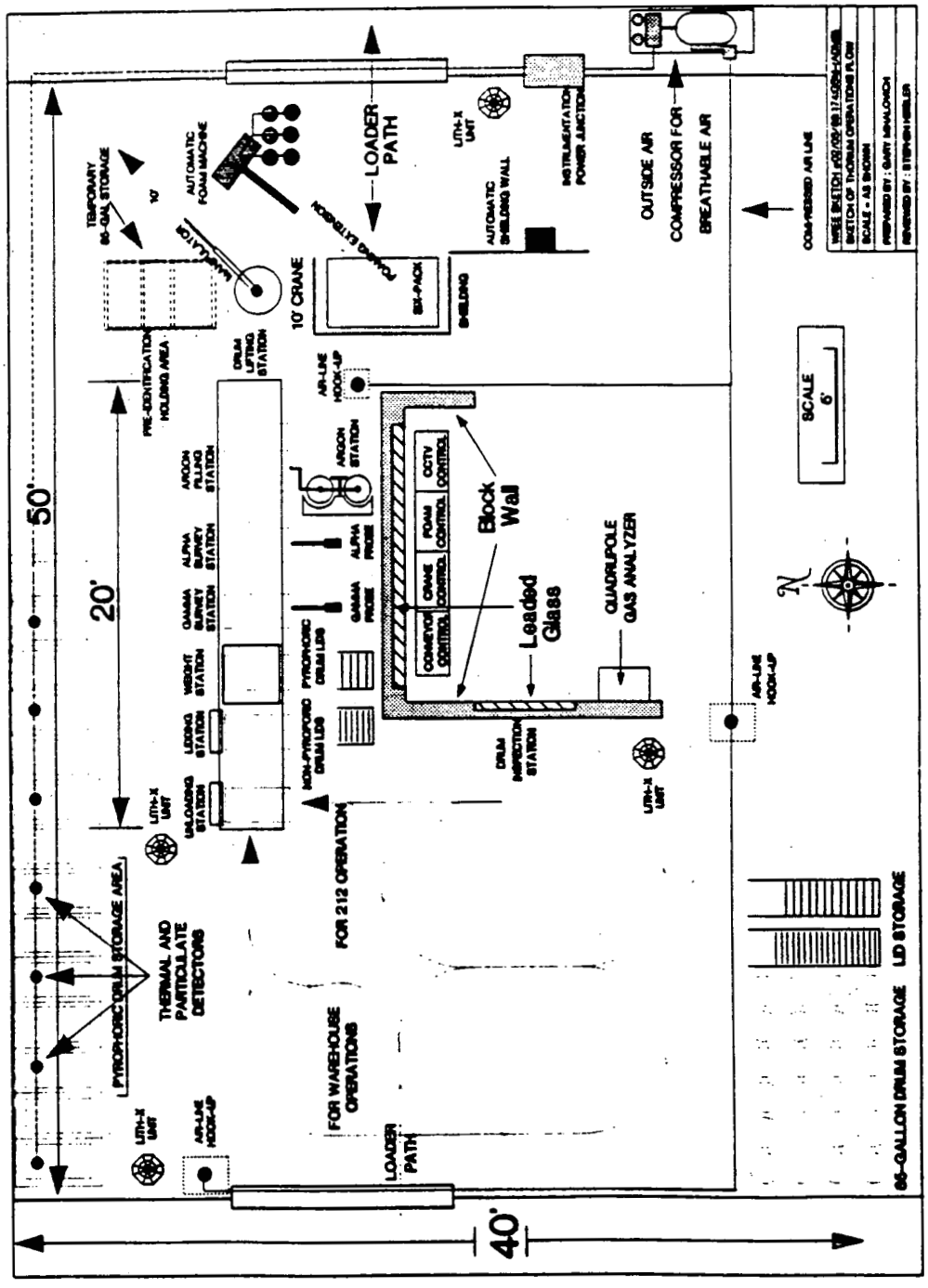
Figure 4



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The multiple container overpacks will be stored in empty bay(s) in the north end of FMPC Warehouse Building #64 for interim storage until final disposition of the thorium materials is identified and implemented.

During the handling, identification and overpacking process all drums will be handled as if they contain potentially pyrophoric thorium metal fines until the contents of the container are positively identified to contain nonpyrophoric thorium materials.

The containers identified as containing potentially pyrophoric thorium metal fines will have the new individual overpack containers flooded with an inert gas (argon) during the identification and overpacking process. This will preclude ignition of the thorium metal fines and help to ensure the safe storage of the material. An argon filling station is provided in the remotely controlled conveyer system.

The individual overpack containers with the potentially pyrophoric thorium metal fines will not be overpacked in the multiple overpack (six-pack) containers. The individual overpacks, after being filled with argon gas, will be placed in interim onsite storage. The individual overpacks will be equipped with pressure gauges for the monitoring of the containers to ensure that the integrity of the overpack container has not been breached.

The thorium metal fines will be stored in FMPC Warehouse Building #64 for an interim period until the materials can be oxidized using existing FMPC facilities. A routine monitoring program will be implemented for inspection of the thorium fines storage facility. Thermal and particulate detectors will be installed in the thorium fines storage area. Lith-X portable extinguishers will be positioned in the storage area for use in the event of a thorium metal fire. FMPC emergency response personnel will be trained in the use of the Lith-X extinguishers.

Standard Operating Procedures (SOPs) will detail the procedures for the handling and storage of the potentially pyrophoric thorium metal fines. Personnel training programs will address the SOPs.

This project will be conducted in conformance with DOE, OSHA, and FMPC regulations governing Health and Safety. Required permits will be obtained.

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3.0 ALTERNATIVES CONSIDERED:

3.1 No Action -

Under the No Action alternative the 212 drums (241 containers) of thorium materials, including the 21 containers of potentially pyrophoric thorium metal fines, would not be addressed.

The individual drums would continue to deteriorate to the point where the stack of drums would fail, or individual containers would fail, and thorium materials could potentially be released to the environment.

Failure of the stack, or individual drums, could also result in the ignition of the pyrophoric thorium metal fines resulting in a thorium metal fire. A thorium metal fire would release thorium materials to the environment and would endanger personnel responding to the fire.

Failure to overpack the deteriorating containers would result in increased probability of thorium releases to the environment, and possible thorium metal fires, and result in an unacceptable risk to the environment, onsite personnel and offsite residents.

3.2 Overpacking a Portion of the 212 Thorium Drums -

One alternative would be the overpacking of a portion of the 212 drums (241 containers) containing thorium materials. Under this alternative the badly deteriorated drums, the drums containing potentially pyrophoric thorium metal fines, and all of the unidentified drums, would be identified, overpacked and placed in interim onsite storage.

The badly deteriorated drums would be addressed in order to minimize potential thorium material releases to the environment. The drums containing potentially pyrophoric thorium metal fines would be addressed to preclude the possibility of a thorium metal fire. All unidentified containers would also be addressed to ensure that all potentially pyrophoric thorium metal fines are properly identified and overpacked.

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The identification and overpacking of all of the unidentified materials, and the overpacking of a portion of the deteriorated drums, would be a more complicated effort than the Proposed Action. This action would require that all of the drums of thorium materials would have to be handled in order to reach the unidentified or badly deteriorated containers located on the bottom rows.

The handling of all of the drums, and the subsequent overpacking of only a portion of the thorium drums, would not eliminate the potential for future thorium releases to the environment. Overpacking only the currently deteriorated thorium drums would not stop the continued deterioration of the containers that were not overpacked. The drums that are not overpacked in the initial effort would continue to deteriorate thus necessitating their repeated handling and overpacking at some future date. This would increase exposure to FMPC personnel in that the thorium drums would be handled on multiple occasions.

3.3 Construction of a Stack Restraint System -

Another alternative would be the construction of a thorium drum stack restraint system. The stack restraint system would contain all three rows (212 drums) of thorium materials stacked four drums high. Under this alternative the stack restraint system would support the stacks of drums thus preventing the failure of the stacks.

The construction of a stack support system would prevent the failure of the stack but would not stop the continued deterioration and eventual failure of the individual thorium drums. This action would not eliminate thorium releases to the environment from individual containers.

Construction of the stack restraint system would be a temporary measure in that the deteriorating drums of thorium materials would need to be addressed at some future date to eliminate thorium releases to the environment. Addressing the thorium drums at a future date would require the handling of thorium containers more deteriorated than at present thus increasing the possibility of a thorium release to the environment during the effort.

The construction of a stack restraint system would not address the problem of the unidentified thorium materials or the potentially pyrophoric thorium metal fines. Both of these problems would need to be addressed at a future date.

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3.4 Proposed Action -

The Proposed Action is to identify, overpack and provide for the safe storage of the 212 deteriorating drums (241 containers) of thorium materials, including the potentially pyrophoric thorium metal fines, until final disposition of the thorium materials is determined and implemented. This action is required to ensure the continued safe storage of the thorium materials and to prevent thorium releases to the environment.

The identification, overpacking and storage of the thorium materials will eliminate the possibility of individual drum failure, thus minimizing the potential for releases to the environment and the possibility of a thorium metal fire.

This action is preferred because it provides for the continued safe storage of the thorium materials including the potentially pyrophoric thorium metal fines. Consequences related to the implementation of the proposed action include: the positive identification of all of the thorium materials currently in outside storage and the safe onsite interim storage of the thorium materials including the potentially pyrophoric thorium metal fines.

4.0 POTENTIAL ENVIRONMENTAL IMPACTS OF PROPOSED ACTION:

Negligible impacts are expected to occur to the existing environment, onsite personnel, and offsite residents as a result of this project. Overall, this project will result in elimination of thorium material releases from the thorium metal storage area and will greatly reduce the potential for ignition of the potentially pyrophoric thorium metal fines.

The attached NEPA Documentation Attachment summarizes the elements involved with the identification and overpacking of the 212 drums (241 containers) of thorium materials.

The construction time for the installation of the overpacking system is estimated to be four to six weeks. Two man to four man crews are anticipated for the installation of the equipment during the construction of the facility.

The following is a summary of the types and quantities of construction rubble estimated to be generated during the construction of this project:

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- fifteen (15) cubic meters of miscellaneous packing containers (cardboard, paper, skids, etc.)
- one and one-half (1.5) cubic meters of concrete
- miscellaneous metal

Construction of the overpacking system will be inside the Plant 9 Warehouse (Warehouse Building #64), as such no erosion control measures will be implemented.

During the handling, identification, and overpacking of the 212 drums of thorium materials several measures will be implemented to control spills and avoid worker exposure. These measures will be detailed in the Standard Operating Procedures (SOPs) for the program and will be covered at length in the personnel training program for the project. The following is a summary of some of the major measures that will be implemented during the proposed project to control spills and reduce worker exposure:

- The fork-lift for the thorium drum handling operations will be shielded to reduce radiation exposure to operating personnel.
- Fork-lift operating personnel will be supplied with a clean air supply.
- All remote handling and overpacking operations will be conducted from behind a shielded wall with leaded glass to reduce radiation exposure to operating personnel.
- Personnel operating the remote handling system will be equipped with a forced-air supply system. Three air-line hook-up stations will be provided in the overpacking area.
- Potential thorium metal fires will be controlled with Lith-X portable extinguishers. Four Lith-X unit stations will be positioned in the overpacking area.
- Single drums of thorium materials will be handled to minimize the possibility of multiple-container spills or multiple-container thorium metal fires.
- Thorium metal fines will be individually overpacked and flooded with an inert gas (argon). A routine inspection and monitoring program will be instituted for the surveillance of the thorium materials.
- Thermal and particulate detectors will be installed in the pyrophoric thorium metal fines storage area.
- A portable HEPA vacuum system will be stationed in the overpacking area.

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These measures are additionally complimented by the FMPC Spill Prevention Control and Countermeasure (SPCC) Plan. Radiological spills or releases of materials are covered in "Appendix E", of this plan.

None of the overpacked thorium materials will be transported offsite as a part of this action. All thorium materials involved in the overpacking effort will be placed in interim onsite storage in the North bay of Warehouse 64.

The handling, identification, overpacking and onsite interim storage of the thorium materials will take place away from routine production activities and will not directly involve production personnel. As such, this project will have no impact on FMPC production.

Several health and safety benefits will be a direct result of the thorium metal overpacking and interim storage effort. The primary benefit will be the positive identification and overpacking of all of the thorium materials currently stored outside in deteriorating drums. This action will ensure the continued safe storage of the thorium materials and will eliminate the potential for future thorium releases to the environment due to the deteriorated condition of the thorium containers.

The thorium overpacking program will have the additional benefit of the positive identification of all of the materials currently in outside storage, including the 21 containers of potentially pyrophoric thorium metal fines. This identification, and subsequent overpacking, will provide for the safe storage of the potentially pyrophoric thorium materials under an inert gas environment (argon). This action will greatly reduce the potential for a thorium metal fire due to the deterioration of the existing drums, or the collapse of the stack of thorium drums, as they currently exist.

4.1 Potential Accident Scenarios

The radiological exposures resulting from postulated accidents would be a function of the immediate conditions prevailing at the time of each event. In all cases, releases would be of short duration, measured in minutes, and the spread of particulates would be subject to the existing meteorological conditions (wind speed, wind direction, and atmospheric stability). Occupational workers at the scene of the accident would be trained to move up-wind of the release, put on appropriate respiratory equipment, and then respond to mitigate the magnitude of the accident.

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Three accident release scenarios were postulated to provide a basis for assessing the potential magnitude of impacts that could occur during the proposed action. In all cases, the result is an unplanned airborne particulate release of the Th-232 to the atmosphere. Considering the nature of the proposed action, such airborne releases are the most likely pathway of accidental exposure to the public. The inhalation pathway is the dominant mode of exposure for the Th-232.

Accident scenario one, the most likely postulated accident, involves a puncture by the fork-lift arms while moving the containers from storage cradles or platforms to the overpacking area. The consequences of such an accident were evaluated by considering an initial release associated with the spill and a subsequent release due to resuspension of the spilled material. Although procedures will be in place requiring the repair of such punctures prior to handling, the close spacing of containers in the stored inventory increases the likelihood that such damage will not be recognized before the container is moved.

Accident scenario two is a postulated accident involving a rupture of a container as a result of a container drop or failure during mechanical overpacking activity. The same methodology used for a puncture was used to model the release due to rupture. This is the second most likely accident scenario that is postulated.

Accident scenario three is a postulated accident involving a fire in one of the drums of finely divided thorium materials. It is postulated that an accidental breach exposed the pyrophoric materials to the atmosphere resulting in a thorium fire. This accident is postulated to occur outside during the handling activities.

5.0 CONCLUSION:

The current condition of the 212 drums of thorium materials, and the configuration of the drums as they currently exist in outside storage, present an unacceptable risk to FMPC employees and the adjacent population. The identification, overpacking and interim onsite storage of the thorium materials will provide for the remediation of the current storage problem and will have an overall positive environmental impact. The implementation of the thorium metal overpacking and interim onsite storage program will provide for the continued safe storage of the thorium materials.

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Potential adverse impacts related to personnel health and safety will be mitigated through appropriate training, application of approved standards and operating procedures, and the use of proper personnel protective equipment. The radiation hazard will be kept at the ALARA level by the use of shielding, remote video-viewing, remote or semi-remote handling procedures, and limiting personnel exposure time. All personnel involved in the program will be required to undergo radiation exposure monitoring. Monitoring will include using personnel dosimeters and area air samplers.

The Thorium Metal Overpacking and Onsite Interim Storage Project represents an action which may be taken during the course of an ongoing EIS, as defined by the Council on Environmental Quality (40 CFR 1506.1). As such this action:

1. Do not have net adverse environmental impacts. This project will provide increasing safety to the interim storage of thorium onsite. Little scrap will be generated during the course of this action, however the positive impacts of this action will be somewhat offset by the fact that a certain degree of uncertainty exists regarding the stability of the thorium metal fines. Precautions will be taken to minimize the possible impacts of this action.

2. This action does not preclude the choice of reasonable alternatives to the action being undertaken. Should changes in programmatic priorities for the FMPC occur the thorium will be safely overpacked and ready for removal to a more permanent storage location, or transfer to another site for utilization.

6.0 CUMULATIVE IMPACTS:

It has been determined that overpacking the 212 drums of thorium currently stored outside in a less than optimal condition is unlikely to have net negative environmental impacts. Other reasonable alternatives are not precluded by this action.

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1.0 Will any of the following be encountered, handled, stored, used, or disposed of during the construction of the proposed program or project?

Radioactive materials (identify) Thorium and Thorium Daughters	(Y)	N	U
Hazardous materials (identify)	Y	(N)	U
Toxic materials (identify)	Y	(N)	U
Mixed hazardous and radioactive materials (identify)	Y	(N)	U
PCB's (identify source)	Y	(N)	U
Asbestos (identify source)	Y	(N)	U
Organic chemicals (identify)	Y	(N)	U
Heavy metals (identify)	Y	(N)	U

2.0 Will program activities involve discharges to any one of the following systems during the construction of the proposed project?

Low level waste disposal (describe)	Y	(N)	U
Process waste stream	Y	(N)	U
Sanitary waste stream - Approximately fifteen (15) cubic meters of miscellaneous packing containers (cardboard, paper, skids, etc.)	(Y)	N	U
Storm sewer	Y	(N)	U

3.0 Will any of the following be encountered, handled, stored, used, or disposed of during operation of, or following the proposed program changes?

Radioactive materials (identify) - Thorium 232	(Y)	N	U
Hazardous materials (identify)	Y	(N)	U
Toxic materials (identify)	Y	(N)	U
Mixed hazardous and radioactive materials (identify)	Y	(N)	U
PCB's (identify source)	Y	(N)	U

Asbestos (identify source) Y (N) U

Organic chemicals (identify) Y (N) U

Heavy metals (identify) Y (N) U

4.0 Will program activities involve discharges to any one of the following systems during operation of, or following the proposed program changes?

Low level waste disposal (describe) Y (N) U

Process waste stream Y (N) U

Sanitary waste stream Y (N) U

Storm sewer Y (N) U

5.0 Are uncontrolled emissions, discharges, or spills possible during:

The construction phase of this project? Y (N) U

The operational phase, upon completion of the project? (Y) N U
- Emissions, discharges and/or spills are possible during the operational phase of the project, but every possible precaution is being taken to avoid such events.

6.0 Will the project involve any of the following:

Need for aboveground storage during construction?	Y	(N)	U
Need for underground storage during construction?	Y	(N)	U
Need for aboveground storage during operations?	(Y)	N	U
- Storage of the overpacked thorium materials is required in the North bay of Building #64.			
Need for underground storage during operations?	Y	(N)	U

7.0 Is the project located in close proximity to a natural stream or within the floodplain of a natural stream? Y (N) U

8.0 Are controlled emissions or discharges planned during:

The construction phase of this project?	Y	(N)	U
The operational phase, upon completion of this project?	Y	(N)	U

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